

Transforming the University

**Preliminary Report of the
AHC Task Force on Health Professional Workforce**

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Date: March 27, 2006

1. Executive Summary.

Combined, the six schools of the Academic Health Center educate and train 70% of Minnesota's dentists, advanced nurse practitioners, pharmacists, physicians, public health professionals, and veterinarians. In addition, many graduates become researchers and faculty in Minnesota, nationally and internationally. The growing demand for health professionals, the increasing cost of health professional education, the decreasing public investment in health professional education, and the shift to community-based education partnerships in Minnesota necessitates an analysis of how we will meet the state's future health professional workforce needs.

This Health Professional Workforce Task Force report includes data collection, analysis and documentation of these state and national workforce trends and describes current AHC initiatives that address these complex issues. Further, the report includes a series of recommendations the Task Force hopes will guide collective response to decision-making. Broadly, our recommendations are as follows:

- The AHC should convene stakeholder groups to monitor workforce issues, develop a health professions workforce monitoring function that is integrated into an AHC office with dedicated resources, create an “agile” model of data collection that provides timely response to changes in health care practice, and create an education and communication strategy to accompany release of relevant information.
- The AHC should develop an appointment process for community-based faculty, develop an infrastructure to support health professions education, design systems that assure appropriate faculty reward and recognition for participating in community-based activities, engage organizational leaders in the development of community partnerships, and engage additional state-wide partners, as appropriate.
- The AHC should transform its culture to embrace interprofessional education, develop sustainable systems to assure exemplary interprofessional educational programs, adopt the CAIPE definitions of interprofessional education to guide further development of education and practice, and designate a central coordinating entity and manager of interprofessional education activities in the AHC.
- The AHC should create an ongoing tracking mechanism that will monitor educational expenses and revenues across the AHC, charge a planning group to research scholarship opportunities to maximize financial aid options for AHC students, and develop a plan to address contingencies of a fragile funding structure.

Recommendations regarding emerging trends in health professional education and creative approaches to transforming health professional education will be included in the Task Force's final report.

Deliverables

1. Develop a methodology for determining class size and enrollment for each of the health professional schools in which the University is the major source of providers for Minnesota and the region.
2. Define the role of the University in the community partnerships necessary to educate and train the next generation of health professionals. Delineate principles for partnerships, the infrastructure necessary to sustain these partnerships, educational quality control, and accountability systems.
3. Define the role and best use of interprofessional education in training of the next generation of health professionals. Delineate new interprofessional education and care delivery models, the scope of their use, barriers to their use and approaches for overcoming those barriers, and how the models would be financially supported.
4. Clarify the resource needs and funding sources of the current paradigm of health professional education. Identify where cost reductions can occur, where additional revenue is needed, and what the source(s) of that revenue could be.
5. Address the following question: What are the emerging trends in health professional education and how might we use them for transformative change in our current paradigms?
6. Report on creative approaches to transforming health professional education that you may encounter during the course of your work.

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Themes outside the Scope of Taskforce Inquiry

- Health Professionals who are trained in other countries and the issues related to education and workforce.
- The achievement gap and educational pipeline issues that affect health professional enrollment and workforce issues.

III. Response to Deliverables.

Introduction

The University of Minnesota Academic Health Center (AHC) is one of a small number of land-grant universities with six health professions schools in one institution: School of Dentistry, Medical School, School of Nursing, College of Pharmacy, School of Public Health, and College of Veterinary Medicine. In addition, the Academic Health Center is developing a Center for Allied Health Programs with a long-range goal to work with the Minnesota State College and Universities and other partners to consider a statewide School of Allied Health Professions. Many AHC programs are highly regarded and ranked in the top ten on national lists.

The Academic Health Center plays a unique role in the state of Minnesota. The AHC educates two-thirds of Minnesota's health professionals (dentists, physicians, advanced nurse practitioners, pharmacists, public health professionals, and veterinarians). In the

2005-06 academic year, the AHC has more than 6,000 health professional students in 64 undergraduate, graduate, first professional and advanced professional degree programs. These programs are accredited by 194 discipline-specific and specialty accreditation agencies with oversight of education. AHC schools have a statewide and regional scope. The College of Pharmacy is the only pharmacy school in the state. The School of Dentistry, School of Public Health, and College of Veterinary Medicine are regional schools. Currently, the School of Nursing offers the only doctoral degree in nursing in the state. In addition to statewide and regional responsibilities, AHC schools play a significant role in preparing future faculty and biosciences researchers.

The Task Force

Importantly, Task Force members point out the long national history of miscalculation across professions when projecting and responding to workforce needs. The approach of the AHC Health Professions Workforce Task Force was to “take stock” internally of the AHC schools in the current workforce environment in health care, communities and other employers of our graduates. Members recognized that in order to address the charge a significant amount of baseline data needed to be collected to provide a context to serve preliminary discussions. The Task Force recognizes that significant engagement of multiple stakeholders must help envision and shape the future with the Academic Health Center. External needs must drive future decisions. Therefore, the Task Force will engage the public during the open comment period and recommends that the AHC continue to give this important topic attention in the future.

It is the Task Force’s belief that this process marks the first time that the Academic Health Center has looked collectively at workforce matters with the goal of developing a vision, a comprehensive plan and recommended action steps. However, the Task Force notes that its work builds upon considerable discussion and efforts already underway in the AHC and the schools. These efforts are described through the appendices of this document.

The strategic repositioning process aims to transform the University into one of the top three public research universities in the world. This effort for the AHC translates to educating and supporting world-class biosciences researchers and preparing future faculty who can compete internationally. On the other hand, the Task Force recognizes that while striving to meet this important goal, it is also critical that the Academic Health Center not lose focus on its traditional role of serving Minnesota and the upper Midwest Region. Our schools are statewide and regional, and our graduates play a vital role in maintaining the health professions workforce for global companies, such as those in Minnesota’s “Medical Alley.” We feel strongly that the AHC has a responsibility to educate the next generation of health professionals for Minnesota, a focus since the AHC’s strategic visioning and planning process of 2000. Therefore, the Task Force reaffirms Goal 1 in the 2005 AHC Strategic Plan:

Create and Prepare the New Health Professionals for Minnesota.

Deliverable #1. Develop a methodology for determining class size and enrollment for each of the health professional schools in which the University is the major source of providers for Minnesota and the region.

Recommendations

1.1. The Academic Health Center should proactively convene stakeholder groups for multi-dimensional monitoring of workforce issues and co-creating a vision for a vibrant health professional workforce.

Many Task Force members noted that AHC schools over the past several years have developed a collaborative spirit and are more interested in working collectively to find solutions than in competing with each other. In this spirit, it is time to develop a holistic approach to workforce development strategies. We recommend convening AHC schools with health care, health care regulatory bodies, community and other stakeholder groups for continuous, substantive discussion of health care workforce issues. A stakeholder group could perform the following functions:

- Build upon the findings and recommendations of this report.
- Monitor future production needs to enable the AHC to respond effectively. What models of practice and education are needed? Are we educating the “right” professional?
- Develop strategies to address the perceived “disconnect” that exists between regulation, accreditation, higher education, health systems and reimbursement and its impact on health professions education.
- Consider a far-sighted model of continuing education that would explore new career entry and re-entry points. What choices do we offer health science professionals for real retraining throughout their careers? Will our graduates shift the focus of their careers at some point? How can we prepare to help them?
- Participate in the national dialogue with the health care system, accreditation, regulatory, governmental and other agencies to assess the demand for and impact of the changing roles, new professions, and emerging degrees, in such fields as nursing, physical therapy, occupational therapy and medical technology.

1.2. The Academic Health Center should develop a health professions workforce monitoring function that is integrated into an AHC office with dedicated resources for analysis and support.

Some individual AHC schools track career and practice choices of graduates. The Dental School, for example, recently began to collect extensive data on its graduates, a practice that might serve as a model for future data collection across the AHC schools. (*See Appendix D.5.*) As a whole, however, the Academic Health Center does not comprehensively or continuously monitor workforce and enrollment trends. For example, the Task Force work was made more difficult by the considerable effort required to collect data to understand the current workforce and enrollment situation. A permanent and transparent monitoring function, which we have termed the “AHC Workforce and

Enrollment Analyst Function,” would ensure the sustainability of efforts to continually and consistently collect and analyze data across AHC schools for strategic decision-making, including decisions regarding class enrollment size, within the AHC.

For the purposes of this report, the Task Force chose to focus broadly on workforce trends of the six health professions represented by the AHC schools: Dentistry, Medicine, Nursing, Pharmacy, Public Health, and Veterinary Medicine. (*See Appendices D.1. and D.2.*) In the absence of a central monitoring function, the Task Force also requested data from the six schools. (*See Appendix E.2.*) Public Health and Advanced Nurse Practice data not included in this report will appear in the final report analysis.

The Task Force noted that current models of data collection are still hampered by structure. That is, each of the six AHC schools and colleges collects its own data separately using varying elements and categories, a practice that mirrors the separate disciplinary “silos” of health professions education in general. Common data elements would make possible uniform analysis across AHC schools and allow for broad-based health professions workforce analysis.

In its review of the data collected from the six AHC schools, the Task Force identified the following trends that might significantly affect the health professions workforce and any recommendations on AHC schools class enrollment size. (*See Appendix D.1.*) These trends include: demographic aging shifts that will impact health professional retirements, slowing state labor workforce, and increased demand for health service delivery; demographic racial and ethnic diversity shifts; gender issues in increasing women in health professions workforce; workforce shortages and maldistribution; achievement gaps in health professions pipeline; student indebtedness; and decreasing state and federal support for higher and health professions education.

1.3. Create an “agile” model of data collection that can provide timely responses to changes in health care practice so that educational institutions can quickly and effectively plan for future needs.

The proposed AHC Workforce and Enrollment Analyst Function would develop common elements for annual data collection across schools and professions and would work with existing resources such as the Office of Rural Health and Primary Care, the Minnesota State Demographer, the Minnesota Rural Health Center, and other resources that collect licensure data, for continuous workforce data input. In its search to understand the state’s future health care needs and its resulting effect on forecasting AHC class sizes, the Task Force reviewed Dr. Bryan Dowd’s Physician Workforce Methodology, a data collection model that attempts to predict the supply of physicians and physician-hours needed per capita in Minnesota through the year 2030. (For more information on the Physician Workforce Methodology, visit www.mmaonline.net/publications/MNMed2004/August/Dowd.html.) Dr. Dowd discussed the difficulty of estimating future health care needs and noted that this methodology provides only gross estimates that rely primarily on Census population

projections; the model does not attempt to address other factors, such as the outlined significant trends that can impact workforce. The Task Force is initiating a project to apply the model to the other health professions.

The Task Force considered another model, the Health Professionals Workforce Projection Model, also developed by Dr. Brian Dowd. (*See Appendix D.4.*) This model aims to predict the supply of and demand for health professionals by understanding the complex factors such public spending priorities and public subsidies of training and insurance; demographic, disease and insurance trends; cost of health professions education; future models of reimbursement; and matching what professionals are paid for to patient needs.

Data collected across schools informed the Task Force about trends in applications, admissions, enrollment and exit plans of graduates. These data are important in understanding “input” and “output” trends of schools. The Task Force recommends building on these models to create a Health Professions Education Model that will inform AHC schools’ enrollment planning and will assist the Senior Vice President for Health Sciences with the AHC school deans in strategic decision-making regarding enrollment management and other responses. (*See Appendix E.1.*)

1.4. Create a carefully planned education and communication strategy to accompany any release of information regarding class enrollment size.

The Task Force strongly suggests that any release of data regarding class enrollment size should be accompanied by a carefully planned education and communication strategy that acknowledges possible ramifications of such release. All strategies should include plans to release data in a way that is meaningful to internal, external and lay audiences.

Although this charge requested recommendations on class enrollment methodology in the health professional schools, the Task Force remains extremely cautious about publishing specific numbers. Experience has taught us that previous attempts by local and national bodies to develop specific numbers have contained gross miscalculations that have harmed professions, higher education, and individuals. In fact, previous workforce shortage reports have created a series of short-sighted responses that had a long-term impact on health professions. The 1995 Pew Commission Report, for example, recommended closing pharmacy and dental schools nationally, and in the early 1990s the state legislature recommended closing the University of Minnesota School of Dentistry and College of Veterinary Medicine. Today, all three health professions are experiencing workforce shortages and maldistribution.

Deliverable 2. Define the role of the University in the community partnerships necessary to educate and train the next generation of health professionals. Delineate principles for partnerships, the infrastructure necessary to sustain these partnerships, educational quality control, and accountability systems.

The Task Force recommends developing a strategic plan for community partnerships. The strategic plan should delineate an infrastructure that includes support and coordination of clinical rotations across the AHC, principles of partnership, contracts that define the level of partnership and associated responsibilities, and resources for support. This partnering may include timely consultation on educational, financial and health care issues. Regional campuses or resource centers may be developed to support these partnerships. *(For more detailed information on community partnerships, see Appendix F.)*

Specific recommendations regarding community partnerships follow:

Recommendations

2.1. Development an appointment process for community-based faculty across the AHC.

Collaboratively design specific recommendations and intended outcomes that will allow for the development of a comprehensive AHC-wide system for community-based faculty connected to the Academic Health Center through its schools and colleges. Aspects of the comprehensive system should incorporate and address the following key areas of emphasis: recruitment, appointment, management, quality assurance in clinical practice, communication, recognition, support, and evaluation.

2.2. Develop an infrastructure to support health professions education.

An effective infrastructure should address oversight of community rotations, coordination and scheduling of students at clinical sites, facilities coordination, etc.

2.3. Design systems that assure that faculty receive recognition and reward for participating in community-based partnership activities. This includes faculty who are campus-based, community-based, affiliated, and preceptors.

This system should assure that community-based faculty are recognized and rewarded for their significant contributions to the education of future health professionals, create appropriate promotion and tenure credit for developing and rewarding campus-based faculty for this work, and support development of educational methods that are innovative, learner-centered, flexible, evidence-based, and interprofessional.

2.4. Engage organizational leaders in the development of community partnerships.

Currently, many community partnerships occur with individual providers; large community organizations may not understand or support these individual partnerships. Partnerships could be strengthened with increasing ownership and commitment by the leadership of these partners. These include the CEOs and Boards of hospitals, clinic systems, and health systems, as well as the managers at all levels of these complex organizations.

2.5. Engage additional state-wide partners, such as boards, state agencies, licensing boards, statewide coordinating bodies, and other organizations, as appropriate.

The AHC and its schools must continue to work with those groups and organizations that have significant responsibilities for the workforce and the education of future health professionals. The Task Force anticipates the need for significant change to address the future of health care in Minnesota and nationally, the financing of health professions education, and promoting health of Minnesota citizens while educating the next generation of health professionals.

Deliverable 3. Define the role and best use of interprofessional education(IPE) in training of the next generation of health professionals. Delineate new interprofessional education and care delivery models, the scope of their use, barriers to their use and approaches for overcoming those barriers, and how the models would be financially supported.

Task Force members conducted several information gathering sessions to further understand interprofessional education in the AHC. They met with the associate deans for education, the individuals charged with administration of education in their schools, the student consultative committee, and faculty and students who have participated in interprofessional education in the AHC. These sessions confirmed the following:

- No formal curriculum between schools exists to teach students about other health professions, collaboration, or the team approach.
- The barriers to implementing IPE, for the most part, remain.
- The significant investment and outcomes of interprofessional work continues to be driven by passionate faculty and students. For example, the AHC currently offers over 60 interprofessional education activities, but they function independently and lack coordination and support.

The Task Force recognizes that the workforce data collected by individual health professions continues to be located in “silos”. In projecting the future workforce needs quantitatively, Task Force members recognized that the health care system in this country is considered to be broken, and that once again collaboration across health professions has emerged in the name of quality, patient safety, and high performance, among other values for health care. A number of discussions ensued regarding transforming the AHC by developing a “team” focus.

The Task Force recommends developing a strategic plan to address implementation of interprofessional education throughout the AHC. *(See Appendix G for more information.)* Specifically, we recommend the following:

Recommendations

3.1. Transform the culture of the AHC to embrace interprofessional education values.

Revise Academic Health Center materials such as the mission and values statements to determine whether they communicate “interprofessional”, “interdisciplinary” and/or “team approach to care” reflective of new models of collaboration and quality improvement and consistent with expectations of health care systems.

3.2. Develop sustainable systems to assure exemplary interprofessional educational programs.

Develop the financial model to support interprofessional faculty, faculty development, facilitation of interprofessional scheduling, tuition and fee attribution, and central assistance with development of instructional materials, including, but not limited to, web-based materials, information technology and support. IPE efforts need to include measurable outcomes, such as student attitudes, benchmarks of professionalism and attitudes, and systems and quality improvement skills. Incorporate into each school new curricula and teaching materials and implement a complete evaluation system with plans to measure for evidence of improved quality of care and improved health.

3.3. Adopt the United Kingdom Centre for the Advancement of Interprofessional Education (CAIPE) definitions of interprofessional education to guide further development of education and practice.

CAIPE (UK Centre for the Advancement of Interprofessional Education) defines interprofessional education (IPE) as occasions when two or more professions learn from and about each other to improve collaboration and the quality of care. Interprofessional education helps students develop the competencies needed to work together to provide appropriate care to patients, their families and the community: an awareness of the expertise, roles and values of other professions skills and strategies for working on a team, including:

- recognizing the patient/client and their support systems as central components of the team;
- establishing a team decision-making process;
- agreeing on shared goals, expectations and responsibility;
- recognizing the differences and overlaps in the approach of different disciplines;
- building consensus, being flexible and resolving conflicts;
- developing communication skills such as attentive listening, good record keeping and a common vocabulary; and
- learning consultation, collaboration and referral skills.

3.4. Designate a central coordinating entity and manager of interprofessional education activities in the AHC.

This entity would provide a coordination and oversight function to formalize interprofessional education into the AHC curriculum.

Deliverable 4. Clarify the resource needs and funding sources of the current paradigm of health professional education. Identify where cost reductions can occur, where additional revenue is needed, and what the source(s) of that revenue could be.

To address this charge, the Task Force sought two significant analyses. Dr. Peter Zetterberg, Director, Institutional Research and Reporting, analyzed instructional costs and revenue in the AHC. (*See Appendix H.4.*) Beth Nunnally, AHC CFO, analyzed the costs of education borne by communities. (*See Appendix F.*)

During the Task Force process, it became clear that the AHC has not tracked expenses and revenue tied to education across the six schools in a comprehensive and ongoing fashion. Rather, each school has creatively and independently pieced together support for education from many sources. While the Task Force sought a detailed analysis for each degree type or program type from Dr. Zetterberg, we found that data at that level of specificity is not readily available for any program. Using the data that was available, we quickly made several conclusions:

Education is expensive.

Education is expensive for the University, for community training sites, and for health professions students. Training a health professional workforce is expensive, and the details are difficult to isolate. The high level analysis from Dr. Zetterberg gives an approximation of cost, but it is based on many assumptions and its accuracy is limited by a methodology that must be carefully considered in examining the detail. The inescapable conclusion, however, is that education is expensive. While the cost of classroom education is easier to identify, clinical education is integrated into the provision of patient care; therefore, the cost is difficult to isolate from the cost of patient care. Much of the clinical training occurs at clinical sites off-campus, including hospitals and clinics. These faculty are often paid by the site which directly shoulders the expense of training. In addition, these sites typically endure the cost of increased inefficiencies inherent in education. (*See Appendix F.*)

Funding for each discipline and each school is complex and different.

The funding sources for education are many and complex. There is a large variance in the cost of education for different disciplines, primarily because of the cost of faculty. For example, the clinical faculty of the Medical School is generally paid more than faculty in other schools. This may account for part of the increased expense for medical student training; however, this may be balanced by the clinical income that may subsidize the teaching program. Because of methodology limits, the comparison between schools and degree types may be less helpful than comparing trends within each school. What is clear from discussions is health professions education in general is significantly more expensive than undergraduate and many graduate education programs.

Market forces affect health professions education and faculty salaries.

Clinical faculty make less money than their colleagues. For example, a majority of dental school faculty are paid less than 50% of their colleagues in private practice. Salaries must remain competitive in order to attract and retain the best faculty.

Health professional education takes a long-term commitment.

Any discussion of funding sources for health professional education must take into account the extraordinary commitment to education made by students and by the institutions that train them. Pre-health science education can take years in order to meet the rigorous admissions requirements *and* to prepare emotionally for the long-term commitment. For a detailed look at pre-professional, professional, licensure, post-graduate, and accreditation requirements for health professionals, *see Appendix H.5., "Pathways to Health Professions Practice."*

Recommendations

4.1. Create an ongoing tracking mechanism that will monitor educational expenses and revenues across the AHC.

We recommend that the proposed AHC Workforce and Enrollment Analyst Function described in Recommendation 1.2. take on the function of tracking AHC educational revenues and expenses, monitoring trends, and determining the most effective and cost-efficient methods of education while measuring the impact of curricular changes.

4.2. Charge an AHC planning group to research scholarship opportunities to maximize financial aid options for AHC students.

Tuition and debt are at an all-time high, and financial aid has not kept pace. Recent tuition increases coupled along with the full-time nature of the study course has resulted in ever increasing student debt. (The average debt for graduating dental students is \$138,114. *See Appendix H.2.* for additional information about student debt load.) The student's contribution is limited by the amount of debt that can be obtained during training, and some believe that increasing debt has forced individuals away from career choices and practice locations that are vitally needed to address workforce needs. These include some generalist or primary care careers that have traditionally paid less, practice with underserved populations, or health professions shortage areas in rural settings. The huge personal debt incurred, along with the many years of training, may discourage students from pursuing health care careers when they could get into the workforce much sooner with other options. The options for increased financial aid must be explored and maximized. Plans such as loan forgiveness, increased scholarship or community support, and other sources should be explored as additional options.

4.3. Develop a plan to address contingencies of a fragile funding structure.

The funding of health care education is fragile and at imminent risk of failure. The Task Force strongly recommends that the AHC immediately develop a plan that will review

the current funding structure, comprehensively track funding sources and potential risks to those sources, and address contingency funding. Our review of AHC funding sources appears below. *(For further information, see Appendix H.)*

- **Tuition** is limited by student debt and the relative expense of the University to other health professional schools that recruit students away from the University of Minnesota and other career options. Scholarship packages have not kept pace with other universities.
- The state's budget woes have steadily eroded its appropriations to the University. **State funding** continues to be at risk.
- State **MERC funds** received from the AHC are passed directly through to clinical sites to help subsidize health care professional education, primarily off-campus. *See Appendix H.1.* for a complete description of the source of these funds and the risk of losing the funds. *Appendix H* also provides details of the overall program, since state general revenue and tobacco tax dollars are at risk as state budget and priorities change through the legislative process. Medicare support for GME is the largest source of funding for graduate medical education (GME) or residency training, since much of it occurs in hospitals caring for Medicare patients. Highly public efforts to decrease overall Medicare expenses have resulted in a constant decrease in the support of this program and pose a constant risk of a complete discontinuation of the funds. Both of these funds are at risk, as noted by Dr. Blewett's analysis.
- **Federal Title VII funding**, the primary federal source of funds for promoting careers in underserved areas and certain primary care careers, has been significantly reduced in recent years. This funding accounted for \$4.4M of grants to support many programs in the AHC. In 2005, Congress eliminated and decreased funding to these programs by 35 percent, resulting in elimination of several programs in the AHC.
- For most community clinical sites, the patient care mission is primary and health professional students' education is secondary, so that contributions from the sites are at risk as they are forced to be more competitive to maintain their clinical operation. Since contributions are from **patient care revenues**, any risk to patient volume, patient satisfaction, and patient care efficiencies threatens their commitment to education.

Summary

Revenue for education comes from a variety of sources and includes direct and indirect support. Educational cost is higher than commonly perceived. Much of this funding is put together piecemeal, and not as a planned package. If a goal is to identify where cost reductions can occur, where additional revenue is needed, and what the source(s) of that revenue could be, and as funding sources change, the expense and sources of funding should be tracked by the AHC on an annual fashion to maximize planning and to anticipate responses to these changes.

Deliverable 5. Address the following question: What are the emerging trends in health professional education and how might we use them for transformative change in our current paradigms?

The Task Force is meeting in early April to address Deliverable 5. Recommendations for this deliverable will be included in the final report.

Deliverable 6. Report on creative approaches to transforming health professional education that you may encounter during the course of your work.

The Task Force is meeting in early April to address Deliverable 6. Recommendations for this deliverable will be included in the final report.

IV. Recommendations for Prioritizing Deliverables.

Immediate

The Task Force recommends immediate implementation of recommendations and action steps listed in Deliverables 1-4 above.

Demonstrate how the recommendations for each deliverable addresses/ considers the five strategic action area(s) included in the charge.

Recruit, nurture, challenge, and educate outstanding students who are bright, curious and highly motivated.

- Recommendations 3.1 through 3.5, regarding interprofessional education, will serve to recruit and train highly-motivated students.
- Recommendation 4.2, regarding scholarship opportunities for students, will encourage recruitment of highly-motivated students.

Recruit, mentor, reward and retain world-class faculty and staff who are innovative, energetic and dedicated to the highest standards of excellence.

- Recommendations 3.1 through 3.5, regarding interprofessional education, will serve to recruit, reward, and retain world-class faculty and staff.
- Recommendations 2.1 through 2.5, regarding a strategic plan for community partnerships, will serve to recruit, reward, and retain world-class faculty and staff.

Promote an effective organizational culture that is committed to excellence and responsive to change.

- Recommendations 1.1 through 1.3, regarding the development of a methodology for determining class size and enrollment for the AHC schools, will encourage AHC schools to work collaboratively to find solutions to workforce challenges

and encourage integrated data collection and analysis that is responsive to changes in health care practice.

Exercise responsible stewardship by setting priorities and enhancing and effectively utilizing resources and infrastructure.

- Recommendations 4.1 through 4.3, regarding resource needs and funding sources for health professional education, includes a plan to monitor educational expenses and revenues across the AHC and address contingencies of a fragile funding structure.

Communicate clearly and credibly with all of our constituencies and practice public engagement responsive to the public good.

- Recommendation 1.4, regarding the development of a methodology for determining class size and enrollment for the AHC schools, recommends a carefully planned education and communication strategy to accompany release of relevant information.

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Appendix A: Methods Followed

Deliverable #1:

Reports were created for each of the schools in the Academic Health Center (School of Dentistry, Medical School, School of Nursing, College of Pharmacy, School of Public Health, and College of Veterinary Medicine). The goal of the professional summaries was to examine the current health professional workforce, create baseline profiles, illustrate recent trends nationally and locally, identify future projections of need, and describe factors influencing supply and demand of professionals. Data and information were collected through the use of, peer-reviewed journals, public documents from state and national agencies, association publications, and taskforce members' expertise and access to information. Drafts of the documents were initially sent to the taskforce members, representative of the specific discipline, for review. After implementation of their recommended changes, the summaries were then made available to the rest of the taskforce members for comment. Finally, executive summaries were created to highlight key trends for each profession and their implications for enrollment at the University of Minnesota.

In addition to national and state summaries, the Task Force collected 2000 – 2005 applications, admissions, enrollment and graduation data, debtload and percent who practice in Minnesota from each of the six Academic Health Center (AHC) schools. Task Force members identified the school staff member to work with research assistants to collect the data. These individual numbers highlighted available applicant and enrollment information, including percentage from Minnesota, racial and gender profiles of the students/residents, and graduation numbers and percentage deciding to practice in Minnesota. Data from the School of Public Health were submitted as the report was being completed. Because the nature of the programs in public health is somewhat different, analysis of these data will be incorporated into the final report. To date the School of Nursing has not submitted the advanced nurse practice and doctoral program data. These data are important because of the future focus on collaborative practice.

The Health Professions Education Model was developed to provide an overview of the nexus between health professions school systems and workforce issues. School data can be used in this systems approach to enrollment decisionmaking.

Deliverable #2:

Barbara Brandt and Gwen Halaas portrayed at a high level the issues in clinical and community-based education. Data used in required clinical hours were used from the school data collected in Charge 1. Data was collected from the Office of Education to complete details of the report. Elizabeth Nunnally collected the data from DME, IME and MERC funds to estimate the cost and revenue for community education.

Deliverable #3:

The history of Interprofessional Education was captured from archived documents of the Academic Health Center and publications. Task Force members Kathleen Watson, Joanne Disch, Kathleen Krichbaum and Barbara Brandt created the draft document for the committee. On February 24, 2006 a group of faculty, staff and students with significant experience in Interprofessional education met with Task Force representatives to discuss interprofessional education and make recommendations. As part of her regular meetings with the AHC Student Consultative Committee, Barbara Brandt discussed interprofessional education and other educational issues with the members of the committee on March 1, 2006. The CHIP and CLARION Executive Committee also provided recommendations on March 20, 2006.

Deliverable #4:

Louis Ling wrote the section on Financing Health Professions Education. Beth Nunnally, AHC CFO, conducted an analysis for the costs of education borne by the community. At a very high level, the methodology quantifies the number of all FTE student/trainee hours at community practice sites based on the FY05 MERC data; applies a market value for the time community practitioners spend with students/trainees; adjusts for a factor that assumes one practitioner trains, on average, two students/trainees at a time; and adjust for a factor of 25% loss to billable clinical productivity.

Peter Zetterberg worked with the Task Force to conduct an analysis of the direct and indirect costs of educating health professional students borne by the University and of the sources of FY2005 instructional funding.

Rockne Bergman, Office of Student Finance, provided information related to student loan practices and policy issues for health professional education.

Appendix B: Consultations and Communications

- Designated staff in each AHC school to collect and validated school student data
- AHC Associate Deans of Education
- AHC Student Consultative Committee
- Center for Health Interprofessional Programs Director and Executive Committee
- Focus group and online survey of faculty and staff who have considerable experience with interprofessional education
- AHC Office of Education staff to consult on clinical affiliation agreement database, workforce templates, and other administrative issues in education
- Elizabeth Nunnally, Associate Vice President for Finance
- AHC finance officers
- Dr. Peter Zetterberg, Director, University of Minnesota Institutional Research and Reporting
- Minnesota Department of Health Office of Rural Health and Primary Care

Appendix C: Copy of Charge Letter

REVISED September 21, 2005

MEMO TO Barbara Brandt, Professor and Assistant Vice President for Education,
AHC

 Louis Ling, Associate Dean, Medical School- Twin Cities
 Bryan Dowd, Professor, School of Public Health
 Kathleen Krichbaum, Associate Professor, School of Nursing, AHC-FCC

chair

 Kathleen Watson, Senior Associate Dean, Medical School- Twin Cities
 Jon Schommer, Associate Professor, College of Pharmacy
 Gwen Halaas, Assistant Professor, Medical School- Twin Cities
 Ray Christensen, Professor, Medical School- Duluth
 Joanne Disch, Professor, School of Nursing
 Lynn Blewett, Associate Professor, Health Services Research & Policy
 Scott Dee, Professor, Veterinary Population Medicine
 Patrick Lloyd, Dean, School of Dentistry
 Jennifer Cieslak, Special Assistant to the SVP for Health Sciences
 Mary Schmidt, Chief of Staff, AHC Office of Education
 Jonell Rusinko, Principal Informational Rep, AHC Communications

FROM: Frank B. Cerra, Senior Vice President for Health Sciences

RE: AHC Strategic Positioning Task Force on the Health Professional
 Workforce

Thank you for your willingness to serve on the AHC Strategic Positioning Task Force on the Health Professional Workforce. The University's Strategic Positioning process presents a remarkable opportunity for the University and the Academic Health Center to take steps to transform itself into a top three public research institution. The four AHC task forces, of which the Health Professional Workforce is one, build upon the AHC strategic plan and represent the next key steps for us to take. As you pursue your charge, I ask that you engage in bold and visionary thinking and identify strategies that will propel us forward.

President Bruininks has asked that each strategic positioning task force consider the following strategic action areas that were identified in the University's strategic positioning recommendations, *Transforming the University of Minnesota*, endorsed by the Board of Regents on June 10, 2005.

- Recruit, nurture, challenge, and educate outstanding students who are bright, curious and highly motivated.
- Recruit, mentor, reward and retain world-class faculty and staff who are innovative, energetic, and dedicated to the highest standards of excellence.

- Promote an effective organizational culture that is committed to excellence and responsive to change.
- Exercise responsible stewardship by setting priorities and enhancing and effectively utilizing resources and infrastructure.
-

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- Communicate clearly and credibly with all of our constituencies and practice public engagement responsive to the public good.

During the development of the University's strategic positioning plan, certain common themes have been identified that informed the goal to become one of the top three public research institutions in the world. These themes are important to keep in mind as we begin our work. The themes are:

- Strong academic programs and leadership.
- Improved access to success for students demonstrating that a better education leads directly to better results.
- Excellence in research.
- Lowered economic costs through improved services and strengthened core investments.
- Greater alignment across all programs and services.

As you pursue your work, please also keep in mind the following questions:

- What are the strategic directions that will move us toward being a top 3 public research institution?
- What are the areas of excellence and/or comparative advantage?
- What are the actions recommended to achieve these directions, including opportunities for reallocation of resources?
- What are the measures of progress and expected impact?
- What are the incentives necessary to achieve success?
- What are the barriers to success? What strategies exist to overcome the barriers?

The Task Force Charge:

The AHC educates and trains 70% of Minnesota's health professionals. The growing demand for health professionals, the increasing cost of health professional education, the decreasing public investment in health professional education, and the shift to community based education partnerships in Minnesota necessitates an analysis of how we will meet the state's future health professional workforce needs.

The task force should formulate recommendations in the following areas: class enrollment size in our health professional schools; an assessment of the resources required in our current educational model; a definition of the role of interprofessional

education; and recommendations for reducing the cost of educating and training the next generation of health professionals.

More specifically, the task force should:

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- 1.) Develop a methodology for determining class size and enrollment for each of the health professional schools in which the University is the major source of providers for Minnesota and the region. (Examples of the latter are dentistry, veterinary medicine, and public health.)
- 2.) Define the role of the University in the community partnerships necessary to educate and train the next generation of health professionals. Delineate principles for partnerships, the infrastructure necessary to sustain these partnerships, educational quality control, and accountability systems.
- 3.) Define the role and best use of interprofessional education in the education and training of the next generation of health professionals. Delineate new interprofessional education and care delivery models, the scope of their use, barriers to their use and approaches for overcoming those barriers, and how the models would be financially supported.
- 4.) Clarify the resource needs and funding sources of the current paradigm of health professional education. Identify where cost reductions can occur, where additional revenue is needed, and what the source(s) of that revenue could be.
- 5.) Address the following question: What are the emerging trends in health professional education and how might we use them for transformative change in our current paradigms?
- 6.) Report on creative approaches to transforming health professional education that you may encounter during the course of your work.

Task Force Retreat:

I encourage you to attend the strategic positioning task force retreat and work session on Friday, September 16, 2005 at the North Star Ballroom in the St. Paul Student Center. This program is hosted by the Office of the President and is intended for all strategic positioning task forces. Task force co-chairs are asked to attend from 8:30 am – 5:00 pm. Task force members are asked to attend from 1:00 – 5:00 pm.

Deliverables:

The task force's final report is due by **May 1, 2006**. I would ask that you develop a detailed work plan for the task force, which I can review with you by **late October**. The plan should include a plan for receiving ideas and feedback from members of the AHC community and other constituencies and a plan for consultation.

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I would like to receive regular reports on the work of the task forces. We also may want to consider an interim report for purposes of soliciting feedback. We will decide this as we go forward.

Resources:

There are a number of resources available to you as you pursue your charge. These include the Resource Alignment Team, a toolkit of documents and templates, and the professional staff of University Relations appointed to facilitate internal and external communication of progress through the strategic positioning process. The Resource Alignment Team is a consulting group charged with providing support to all task forces in the areas of cross-functional alignment, change management, and subject matter expertise as needed. Support is also available from the Academic Health Center Steering Committee.

Jennifer Cieslak has been appointed Special Assistant to the Senior Vice President and will manage and coordinate the strategic positioning process for me. Jennifer will work closely with task force staff and will be able to help task force co chairs access needed support and assistance. Jennifer may be reached at 612-624-4134 or jcieslak@umn.edu.

Thank you for your willingness to assume this important role on behalf of the University community. Your participation and commitment to this work is vital to the successful implementation of the strategic positioning recommendations and to achieving the goal of becoming one of the top three public research universities in the world.

aks

C: Robert H. Bruininks, President
Robert J. Jones, Senior Vice President, System Administration
E. Thomas Sullivan, Senior Vice President and Provost
Kathryn Brown, Vice President and Chief of Staff
AHC Deans

Appendix D: Workforce Trends

D.1. National and Minnesota Health Professions Workforce Trends

Aging Population

It is estimated that in 2020, the number of people over the age 65 will increase from 35 million in 2000 to 54 million.¹ These changes in the nation's population are particularly important in the context of the demand for health professionals. The elderly are typically those with multiple conditions requiring more regular care. They are the majority of users of long-term care facilities, home health care, and other sources of employment of RNs.² It is also known that age-specific per capita physician utilization rates change along with demographics.³ Demand for dental services is also anticipated to grow as the baby boomers age. There will be greater number of teeth to care for, more teeth will be at risk for dental caries, and people are more likely to need artificial teeth and dentures.^{4,5} Elderly persons also require additional pharmacist services. Increased prescription utilization rates and Medication Therapy Management for beneficiaries covered under Medicare Part D are examples of increased demand for pharmacists.

Aging Workforce

The nation is experiencing a demographic trend that will result in more workers retiring than entering the health occupations. The dental and physician workforces are two examples of professions that have data on number of workers who are expected to retire in the near future. Existence of this data makes it possible to calculate the per year replacement needs for the state.

The aging workforce is particularly important in rural areas in Minnesota where it has been shown that health professionals are older than their urban counterparts.

Growing Diversity of Minnesota and U.S. Population

Diversity in the health care workforce plays a crucial role in improving the health system's ability to care for minority patients. This is especially important as Minnesota's population is becoming increasingly racially and ethnically diverse. For example, between 2005 and 2015, Minnesota's nonwhite population is projected to grow 35 percent, compared to 7 percent for the white population.⁶ Although the true majority of students enrolled in the University of Minnesota health professional schools are white, there is an increasing diversity trend of Asian/Pacific Islander, Hispanic, black, and American Indian decent in many of the schools. Especially the lack of diversity in the dentistry, public health and veterinary professions is of great concern. Improving

¹ *Physician Workforce Policy Guidelines for the United States, 2000-2020*. U.S. Department of Health and Human Services, January 2005.

² *Nursing Workforce Emerging Nurse Shortages Due to Multiple Factors*. United States General Accounting Office, July 2001.

³ *Health, United States, 2004*. National Center for Health Statistics, 2004.

⁴ Valachovic, R.W., Weaver, R.G., Sinkford, J.C., Haden, N.K. *Trends in Dentistry and Dental Education*. Journal of Dental Education, 2001; 65:539-561.

⁵ *Healthy People 2010*. United States Department of Health and Human Services, July 2001.

⁶ Gillaspay, Thomas. *Minnesota's Population Continues to Become More Diverse*. Minnesota State Demographic Center. January 2005.

existing racial and ethnic health disparities among minorities in health problems such as heart disease, cancer, accidents, diabetes, and HIV infections is a major challenge to the predominantly white public health workforce.⁷ The year 2005 showed the first downturn in the percentage of all minority students in schools of Veterinary Medicine nationally for the first time since 1988.⁸ Additionally, the racial/ethnic distribution of the dentist workforce is among the least diverse of all health professions. Approximately 13 percent of dentists nationwide are nonwhite, compared with 22 percent of physicians and 29 percent of the population.⁹

Globalization

The world's population is expected to be 10 billion by 2050. This growth will result in encroachment on animal habitat, leading to increased human interaction with wild and exotic animals and human contact with vectors of disease.¹⁰ These exchanges of both humans and animals and animal products are contributing to increasing rates of global disease transmission. SARS, monkey pox, and avian influenza are current examples of infectious diseases that have demonstrated rapid and wide spread dispersal globally.¹¹ Infectious diseases are currently the third leading cause of death in the United States and the leading cause worldwide.¹² Of the more than 1,700 known pathogens affecting humans, 49 percent are zoonotic, and of the 156 pathogens associated with emerging diseases, 73 percent are known to infect both humans and animals.¹³ These facts translate into a growing demand for culturally competent health professionals, specifically veterinarians and public health professionals.

Gender Issues

Men have historically dominated some professions, such as medicine and dentistry, while others, such as nursing, have been predominantly female. The trend of male dominance has changed in recent years. The percentage of females is expected to increase across all of the health professions in the future. At the University of Minnesota, there has been a gender trend towards female enrollment over the past five years. For example, pharmacy has enrolled from 56% to 81% females over the last years, while medicine has consistently maintained a close half male:female ratio. Other trends to note about the female workforce are that they work fewer hours per week and they tend not to go into

⁷ *Who Will Keep the Public Healthy? Educating Public Health Professionals for the 21st Century*. Institute of Medicine, 2003. Accessed February 1, 2006, from <http://darwin.nap.edu/books/030908542X/html/30.html>.

⁸ *Diversity Matters*. Association of American Veterinary Medical Colleges, 2005.

⁹ Mertz, E., O'Neil, E. *The Growing Challenge of Providing Oral Health Care Services to All Americans*. Health Affairs, 2002; 21:65-77.

¹⁰ *Veterinary Medical Education and Workforce Development Act*. Accessed February 26, 2006 from <http://aavmc.org/documents/VMEWDA.pdf>

¹¹ Becker, K. *An Epiphany: Recent Events Highlight the Responsibilities Roles and Challenges That Veterinarians Must Embrace in Public Health*. Journal of Veterinary Medical Education, 2003; 30:115-120.

¹² Binder, S., Levitt, A.M., Sacks, J.J., Hughes, J.M. *Emerging Infectious Diseases: Public Health Issues for the 21st Century*. Science, 1999;284:1311-1313.

¹³ Becker, K. *An Epiphany: Recent Events Highlight the Responsibilities Roles and Challenges That Veterinarians Must Embrace in Public Health*. Journal of Veterinary Medical Education, 2003; 30:115-120.

specialty areas. This may pose a challenge to Minnesota's health care. In 2003, seven of the top vacancies in medicine were in specialty medicine.¹⁴ Minnesota already has a higher ration of primary care physicians per 100,000 population than the national ratio (76 compared to 69).¹⁵

Lifestyle Issues

Work patterns across all health professions are changing. Professionals are tending to work fewer hours per week. Additionally, more professionals are working part time than previously. These changes have been linked to increasing numbers of women in the workforce, aging professionals, and lifestyle preferences. In Minnesota, nursing is an example of how this impacts the workforce. Minnesota had 943 RNs per 100,000 people in 2000, nearly 19 percent above the national ratio of 793.¹⁶ However, Minnesota RNs also have a higher rate of part-time employment as compared to the rest of the nation (50 percent versus 25 percent).¹⁷ Minnesota registered nurses are also three years older than the national average.¹⁸

Growth in Non-Physician Providers

Shifts in the care delivery model to a more team based approach and efforts to expand availability of health care have emphasized the demand for non-physician providers. Physician assistants, nurse practitioners, and certified nurse midwives now combine to form a group of practitioners that is rapidly approaching 20 percent of the size of the physician workforce.¹⁹ In Minnesota, there are fewer nurse practitioners per capita than the national rate, equal numbers of nurse midwives, and one of the highest rates of nurse anesthetists per capita.²⁰ School of nursing data not included in this report will appear in the final report analysis. The growth in these professions may partially offset the perceived shortages in the physician workforce. It is important to note that these effects may be limited to areas of primary care, rather than specialty areas requiring more complex care.²¹ In addition to growing non-physician providers, dentistry and pharmacy are also increasing their reliance on non-professional providers to improve efficiency and access.

Growing Level of Student Indebtedness

¹⁴ *Minnesota Health Workforce Demand Assessment*. Minnesota Department of Health Office of Rural Health and Primary Care, 2003.

¹⁵ *The Minnesota Health Workforce: Highlights from the Health Workforce Profile*. U.S. Department of Health and Human Services Bureau of Health Professions, 2004.

¹⁶ *Minnesota Registered Nurse Facts and Data*, Minnesota Department of Health, 2004.

¹⁷ *Registered Nurse Workforce Profile*, Minnesota Department of Health Office of Rural Health and Primary Care, January 2001.

¹⁸ *Findings from the Minnesota Registered Nurse Workforce Survey*. Minnesota Department of Health Office of Rural Health and Primary Care, January 2003.

¹⁹ *A Comparison of Changes in the Professional Practice of Nurse Practitioners, Physician Assistants, and Certified Nurse Midwives: 1992 and 2000*. U.S. Department of Health and Human Services Bureau of Health Professions, February 2004.

²⁰ *The Minnesota Health Workforce: Highlights from the Health Workforce Profile*. U.S. Department of Health and Human Services Bureau of Health Professions, 2004.

²¹ Cooper, R. *Weighing the Evidence for Expanding Physician Supply*. *Annals of Internal Medicine*, 2004; 141:705-714.

Tuition at health professions schools nationally has been on the rise. Therefore, students are graduating with higher levels of debt than ever before. In 2005, Minnesota was identified as the most expensive of 74 American public medical colleges for resident tuition and fees, at \$29,638 for first-year students.²² Cost has been identified as a major deterrent for application to medical school.²³ In dentistry, the increase in educational debt has been found to affect both career choice and practice location of dentists.²⁴ Additionally, it is reported that veterinary medicine is more adversely affected by increased student debt than other graduate degrees because veterinarians' ability to repay student loans lag behind other professions. The consequence to the veterinarian profession is that there is a failure to attract the best and the brightest to the profession and its graduates are limited to invest in personal and professional growth.²⁵

Workforce Concerns Summary

The summary documents show predicted shortages in all of the professions except Pharmacy in the near future. In Minnesota, this means that....

- There tends to be uncertainty around workforce projection goals across all professions.
- There are inconsistencies in the data. Different data sources report different numbers of practitioners/population (for example, the Bureau of Health Professions report numbers that are different from what Minnesota's Office of Rural Health and Primary Care reports). Additionally, within the University of Minnesota there are wide variations in the data collection/reporting systems.
- Expansion of the United States economy and growing affluence of the population has been shown to increase demand for dental, veterinary, and medical specialty services.
- Restriction of public funding sources for medical education
- Growing number of required clinical hours for health professional education

University of Minnesota Concerns Summary

- AHC roles and responsibilities to the state of Minnesota
- Variations in University's system of data collection/reporting
- Lack of U central workforce analysis function
- Impact of PhD programs on workforce
- Cost to state to train health professionals
- Application trends and numbers actually accepted
- Trends of students from MN, trained in MN, and those who practice in MN
- Space restrictions at the U deficiencies in quality and quantity of educational facilities space

²² *Debt Weighs on Medical Students*. Pioneer Press. Accessed December 22, 2005 from <http://www.twincities.com/mld/twincities/news/12969961.htm>

²³ *Medical School Tuition and Young Physician Indebtedness*. Association of American Medical Colleges, March, 2004.

²⁴ *Oral Health in America: A Report of the Surgeon General*. United States Department of Health and Human Services, July 2000.

²⁵ Brown, J.P., Silverman, J.D. KPMG LLP Economic Consulting Service. *The Current and Future Market for Veterinarians and Veterinary Medical Services in the United States*. Journal of the American Veterinary Medical Association, 1999; 215: 161-183.

- Faculty recruitment, retention and professional development
- Changes in required clinical hours and site training
- “Type” of student the U is likely to see in the future (diversity of students in the pipeline)

Appendix D: Workforce Trends

D.2. Six Health Professions Overview

A National and State Perspective on the Dentistry Workforce

Executive Summary Trends with Implications for Enrollment Decisions

National

- Professionally active dentists are predicted to decline around 2014.²⁶
- Today's dental workforce is not reflective of the overall population. The racial/ethnic distribution of the dentist workforce is among the least diverse of all health professions. Approximately 13 percent of dentists are nonwhite, compared with 22 percent of physicians and 29 percent of the population.²⁷
- In 2003, 82.8 percent of active private practitioners were male.²⁸ In 2001, the average age of employed dentists was 44.8 years. Male dentists were on average more than 12 years older than females.²⁹
- While recent trends have indicated the more nonwhites are enrolling in dental school, the racial and ethnic distribution of dentists will not represent the demographics of the larger population they are trying to serve.³⁰
- Forces influencing demand for dental care: emphasis on oral health, oral disparities, access to dental care, geographic distribution, dental insurance benefits
- Female dental graduates are more likely than their male counterparts to be working part-time one year out of dental school (16.3 percent compared to 8.6 percent).³¹ It is estimated forecasted that 29.2 percent of active private practitioners will be female by 2020. The question remains of how demographic shifts will affect the future of the dentistry workforce.
- Although there has been an increase in the overall numbers of dentists in recent years, because of the changes in the lifestyles of dentists, the American Dental Association reported only "modest gains in the total number of office hours and the total number of treatment hours available to address the dental care needs of all Americans."³²
- Future employment of dentists is not expected to grow as rapidly as the demand for dental services. As the practice expands, dentists are likely to hire more dental hygienists and dental assistants to handle routine services.³³

²⁶ Valachovic, R.W., Weaver, R.G., Sinkford, J.C., Haden, N.K. *Trends in Dentistry and Dental Education*. Journal of Dental Education, 2001; 65:539-561.

²⁷ Mertz, E., O'Neil, E. *The Growing Challenge of Providing Oral Health Care Services to All Americans*. Health Affairs, 2002; 21:65-77.

²⁸ *Distribution of Dentists in the United States by Region and State*. American Dental Association, May, 2005.

²⁹ *2002 Survey of Dental Practice*. American Dental Association, May 2004.

³⁰ *Workforce Demographics for Minnesota Dentists*. Office of Rural Health and Primary Care Minnesota Department of Health, April 2003.

³¹ *The 2004 Survey of Dental Graduates*. American Dental Association, July 2005.

³² Mertz, E., O'Neil, E. *The Growing Challenge of Providing Oral Health Care Services to All Americans*. Health Affairs, 2002; 21:65-77.

³³ *Occupational Outlook Handbook 2004-2005 Edition*, Bureau of Labor Statistics U.S. Department of Labor. Accessed February 15, 2006, from <http://www.bls.gov/oco/ocos072.htm>.

Minnesota

- In 2001, the average age of dentists in Minnesota was 48. Male dentists on average are 10 years older than female dentists.³⁴
- Females made up 17 percent of the workforce in 2001. This percentage is expected to increase in the future as women make up a larger proportion of dentists under 40 and a growing number of dental students are female (41 percent in 2001).³⁵
- Almost 97 percent of Minnesota's dentists identify themselves as white, compared to 89 percent in the general population.³⁶
- In 2002, it was estimated that 60 percent of current dentists in Minnesota may retire in the next 15-20 years.
- In the late 1990s, Minnesota reported the greatest negative percent change in the dentist to population ratio. The Minnesota dentist-to-population ratio has decreased from one dentist per 1,488 population in the 1980s to one dentist per 1,670 population currently.³⁷
- The Office of Rural Health and Primary Care in the Minnesota Department of Health estimates that in 2004, there were approximately 2,970 dentists. This equates to 58 active dentists per 100,000 population.³⁸ (Estimated retirements by 2020 - 2025: 1,782; number that will need to be replaced to keep pace: 89 per year by 2025; 119 per year by 2020)
- Maldistribution of dentists: Twin Cities versus Greater Minnesota.³⁹ A large portion of Minnesota is a federally designated dental health professions shortage area.

University of Minnesota School of Dentistry – Facts and figures

- XX % of practicing dentists are graduates of the University of Minnesota
- Trends in enrollments since 1980 (State legislature nearly closed the school in early 1990s. Reduced class size from 150 to 75.)
- Since 2000, an average of 64.6% of the SOD class has been Minnesota residents.
- From 2000 to 2002, an average of 33.7%, or 82 U of MN School of Dentistry graduates established practices in Minnesota. ? distribution
- In 2005 the number of applicants to the School of Dentistry has increased by 16% when compared to 2000 The number of qualified applicants is the essentially same as in 2000. The number of accepted students has risen from 85 to 97 from 2000 to 2005.
- Of the 553 dental students who matriculated between 2000 and 2005, 307 (55%) were/are male; 45%, female. 47 of these matriculants, or 8%, are considered “minority.
- Tuition and fees have increased XX% between 2000 and 2005.
- The average School of Dentistry graduate debt load was \$138,114.

National Dental Workforce Summary:

³⁴ *Workforce Demographics for Minnesota Dentists*. Office of Rural Health and Primary Care Minnesota Department of Health, April 2003.

³⁵ *Workforce Demographics for Minnesota Dentists*. Office of Rural Health and Primary Care Minnesota Department of Health, April 2003.

³⁶ *Workforce Demographics for Minnesota Dentists*. Office of Rural Health and Primary Care Minnesota Department of Health, April 2003.

³⁷ DiAngelis, A. *Increasing Demand, Decreasing Access – A Ringside Seat*. Minnesota Medicine, 2005. Accessed February 20, 2006, from <http://www.mmaonline.net/publications/MNMed2005/August/DiAngelis.html>.

³⁸ *Minnesota Dentist Facts and Data 2004*. Office of Rural Health and Primary Care Minnesota Department of Health, 2004.

³⁹ *Workforce Demographics for Minnesota Dentists*. Office of Rural Health and Primary Care Minnesota Department of Health, April 2003.

In 2003, the American Dental Association estimates there were 221,563 dentists in the United States, including 173,574 professionally active dentists (private practitioner, dental school faculty or staff, armed forces, government employed, graduate student, or other health or dental organization). Of this number, there were 160,177 active private practitioners living in the U.S.⁴⁰

Dentists held about 150,000 jobs nationally in 2004.⁴¹ In 2002, 66.5 percent of private practice dentists worked in solo practices, 19.7 percent worked in two-dentist practices, and 13.8 percent worked in three-or-more dentist practices.⁴² Generally speaking the ratio of generalists to specialists in dentistry is 80% to 20%. This number has been relatively unchanged in the last 10 years.⁴³ See the following for employment distribution of general practitioners and specialists.⁴⁴

Dentists, general	128,000
Orthodontists	10,000
Oral and maxillofacial surgeons	6,000
Prosthodontists	1,000
Dentists, all other specialists	5,000

The ratio of dentists to population peaked at 60.2 per 100,000 population in 1994 and has been falling since.⁴⁵ See the following graph.⁴⁶

⁴⁰ *Distribution of Dentists in the United States by Region and State*. American Dental Association, May, 2005.

⁴¹ *Occupational Outlook Handbook 2004-2005 Edition*, Bureau of Labor Statistics U.S. Department of Labor. Accessed February 15, 2006, from <http://www.bls.gov/oco/ocos072.htm>.

⁴² *Key Dental Facts*. American Dental Association, September, 2004.

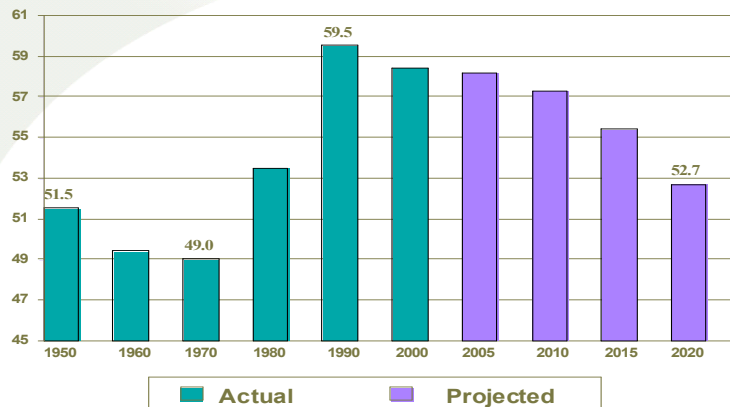
⁴³ *Oral Health in America: A Report of the Surgeon General*. United States Department of Health and Human Services, July 2000.

⁴⁴ *Occupational Outlook Handbook 2004-2005 Edition*, Bureau of Labor Statistics U.S. Department of Labor. Accessed February 15, 2006, from <http://www.bls.gov/oco/ocos072.htm>.

⁴⁵ *Dental Education at a Glance*. American Dental Education Association, 2004.

⁴⁶ *Dental Workforce Supply and Demand*. CPCA Oral Health Summit, June 7, 2002. Accessed February 15, 2006, from http://www.futurehealth.ucsf.edu/pdf_files/CPCA%20Oral%20Health%20Summit.ppt

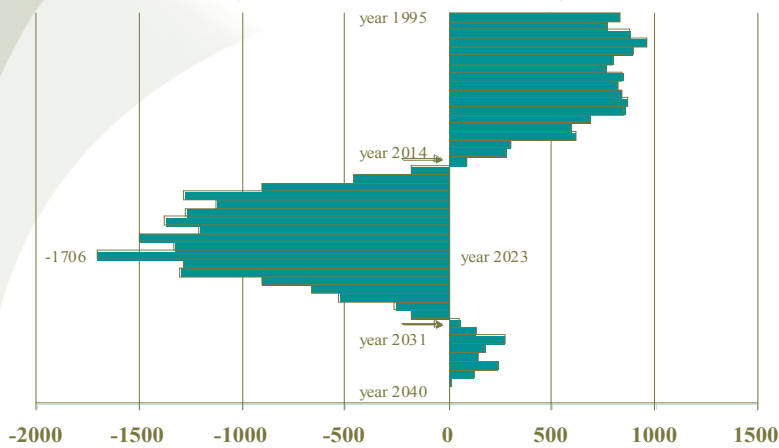
Dentists per 100,000 U.S. Population
1950-2020
(Valachovic et al. JDE, 2001)



Source: Bureau of Health Professions, HRSA, DHHS. Data from the Eighth Report to Congress 1991 and unpublished reports.

Professionally active dentists are predicted to decline around 2014.⁴⁷ See the following.⁴⁸

Estimated Additions of Dentists to the
Dental Workforce: 1995 -2040
(Valachovic et al. JDE, 2001)



**Assumptions: number of graduates remains at 4050
retirement age of 65**

Source: American Association of Dental Schools

Today's dental workforce is not reflective of the overall population. The racial/ethnic distribution of the dentist workforce is among the least diverse of all health professions. Approximately 13 percent of dentists are nonwhite, compared with 22 percent of physicians and 29 percent of the

⁴⁷ Valachovic, R.W., Weaver, R.G., Sinkford, J.C., Haden, N.K. *Trends in Dentistry and Dental Education*. Journal of Dental Education, 2001; 65:539-561.

⁴⁸ *Dental Workforce Supply and Demand*. CPCA Oral Health Summit, June 7, 2002. Accessed February 15, 2006, from http://www.futurehealth.ucsf.edu/pdf_files/CPCA%20Oral%20Health%20Summit.ppt

population.⁴⁹ In 2003, 82.8 percent of active private practitioners were male.⁵⁰ In 2001, the average age of employed dentists was 44.8 years. Male dentists were on average more than 12 years older than females.⁵¹

In 2020, the predicted number of active private practitioners will be 172,097, or 52.7 dentists per population.^{52,53} However, due to projected increases in the productivity of the dental workforce, changing disease patterns, and continuing improvements in the oral health of population, fewer dentists will be needed to manage the oral health needs of the expanding population.⁵⁴ The adequacy of the ratio of dentists per population to meet the nation's oral health needs remains unclear. This is because sizable portions of the population remain underserved due to the geographical distribution of dentists.

Minnesota Dental Workforce Summary:

In January 2005, there were 3,296 dentists with Minnesota licenses, although this number includes those who are retired or not working as a dentist and those who practiced in other states.⁵⁵ It is not certain how many dentists are actually practicing in Minnesota. The Office of Rural Health and Primary Care in the Minnesota Department of Health estimates that in 2004, there were approximately 2,970 dentists. This equates to 58 active dentists per 100,000 population.⁵⁶ This data does not completely correlated with other existing data. The Bureau of Health Professions in the U.S. Health Resources and Services Administration reported that Minnesota had 3,522 practicing dentists in 2000, or 71 dentists per 100,000 people, exceeding the national number of 64.⁵⁷

In 2001, the average age of dentists in Minnesota was 48. Male dentists on average are 10 years older than female dentists.⁵⁸ Females made up 17 percent of the workforce in 2001. This percentage is expected to increase in the future as women make up a larger proportion of dentists under 40 and a growing number of dental students are female (41 percent in 2001).⁵⁹ Almost 97 percent of Minnesota's dentists identify themselves as white, compared to 89 percent in the general population.⁶⁰

In 2002, it was estimated that 60 percent of current dentists in Minnesota may retire in the next 15-20 years. This is particularly important in rural areas where the dentists are typically older

⁴⁹ Mertz, E., O'Neil, E. *The Growing Challenge of Providing Oral Health Care Services to All Americans*. Health Affairs, 2002; 21:65-77.

⁵⁰ *Distribution of Dentists in the United States by Region and State*. American Dental Association, May, 2005.

⁵¹ *2002 Survey of Dental Practice*. American Dental Association, May 2004.

⁵² *Key Dental Facts*. American Dental Association, September, 2004.

⁵³ Mertz, E., O'Neil, E. *The Growing Challenge of Providing Oral Health Care Services to All Americans*. Health Affairs, 2002; 21:65-77.

⁵⁴ Haden, N.K., Catalanotto, F.A., Alexander, C.J., et al. *Improving the Oral Health Status of All Americans: Roles and Responsibilities of Academic Dental Institutions*. Journal of Dental Education, 2003; 67:563-587.

⁵⁵ *Minnesota Dentist Facts and Data 2004*. Office of Rural Health and Primary Care Minnesota Department of Health, 2004.

⁵⁶ *Minnesota Dentist Facts and Data 2004*. Office of Rural Health and Primary Care Minnesota Department of Health, 2004.

⁵⁷ *Minnesota Dentist Facts and Data 2004*. Office of Rural Health and Primary Care Minnesota Department of Health, 2004.

⁵⁸ *Workforce Demographics for Minnesota Dentists*. Office of Rural Health and Primary Care Minnesota Department of Health, April 2003.

⁵⁹ *Workforce Demographics for Minnesota Dentists*. Office of Rural Health and Primary Care Minnesota Department of Health, April 2003.

⁶⁰ *Workforce Demographics for Minnesota Dentists*. Office of Rural Health and Primary Care Minnesota Department of Health, April 2003.

than those practicing in the metro (48.6 years compared to 46.6 years).⁶¹ Rural areas also have lower dentist to population ratios, 1:2,000 compared to 1:1,400 in the metro.⁶²

Factors Influencing Supply and Demand

- *Emphasis on Oral Health:* Oral health like general health has improved dramatically in the last decades. Because of advances in various preventive regimens such as community water fluoridation and increased use of toothpastes and rinses that contain fluoride, the overall incidence dental caries in permanent teeth has declined.⁶³ Additionally, the percentage of children and adolescents aged 5 to 17 who have never experienced dental caries in their permanent teeth continues to increase; and people aged 18 to 34 have less decay and fewer fillings in permanent teeth than ever before. The rates of Americans aged 65-74 that are edentulous have fallen from 45.6 percent in 1971-1974 to 28.6 percent in 1988-1994.⁶⁴ Despite these advances, the United States government has taken action to increase the emphasis placed on oral health in this country. In the 2000, Surgeon General's Report on Oral Health indicated: "oral health is an essential and integral component of health throughout life."⁶⁵

As a response to the 2000 Surgeon General's Report, Healthy People 2010 established new oral health goals as part of the national health agenda. These objectives include reducing the incidence of oral disease across all population groups, promoting disease prevention measures like fluorides and sealants, and improving means for delivering care.⁶⁶ In addition to a greater emphasis on oral health by the government, the public is becoming more aware about dental health and the necessary requirements to maintain it. Higher levels of education coupled with higher discretionary incomes in Americans have increased the value placed on oral health in this country. The desire for cosmetic dental procedures has also grown in recent years. All of these factors have led to an increased demand for dental services.⁶⁷

- *Disparities in Oral Health Status and Access to Dental Care:* One of the great challenges facing the dental profession is achieving a balanced workforce. A balanced workforce is one that is sufficient in number and is educationally and culturally prepared for the various roles required to meet the needs of the population.⁶⁸ There are wide variations in oral diseases and conditions and access to dental care among racial and ethnic groups and between poor and more affluent populations. The rapidly changing racial/ethnic profile in the United States requires a dental workforce that is competent to address routine and uncommon oral problems faced by the population.⁶⁹ Although most Americans receive good oral health care; some still do not. According to a 2000 GAO report, many persons in the United States do not receive essential dental

⁶¹ *Dentist Workforce Profile.* Office of Rural Health and Primary Care Minnesota Department of Health, February, 2002.

⁶² *Dentist Workforce Profile.* Office of Rural Health and Primary Care Minnesota Department of Health, February, 2002.

⁶³ *Oral Health in America: A Report of the Surgeon General.* United States Department of Health and Human Services, July 2000.

⁶⁴ *The Future of Dentistry Report.* The American Dental Association, 2002.

⁶⁵ *Oral Health in America: A Report of the Surgeon General.* United States Department of Health and Human Services, July 2000.

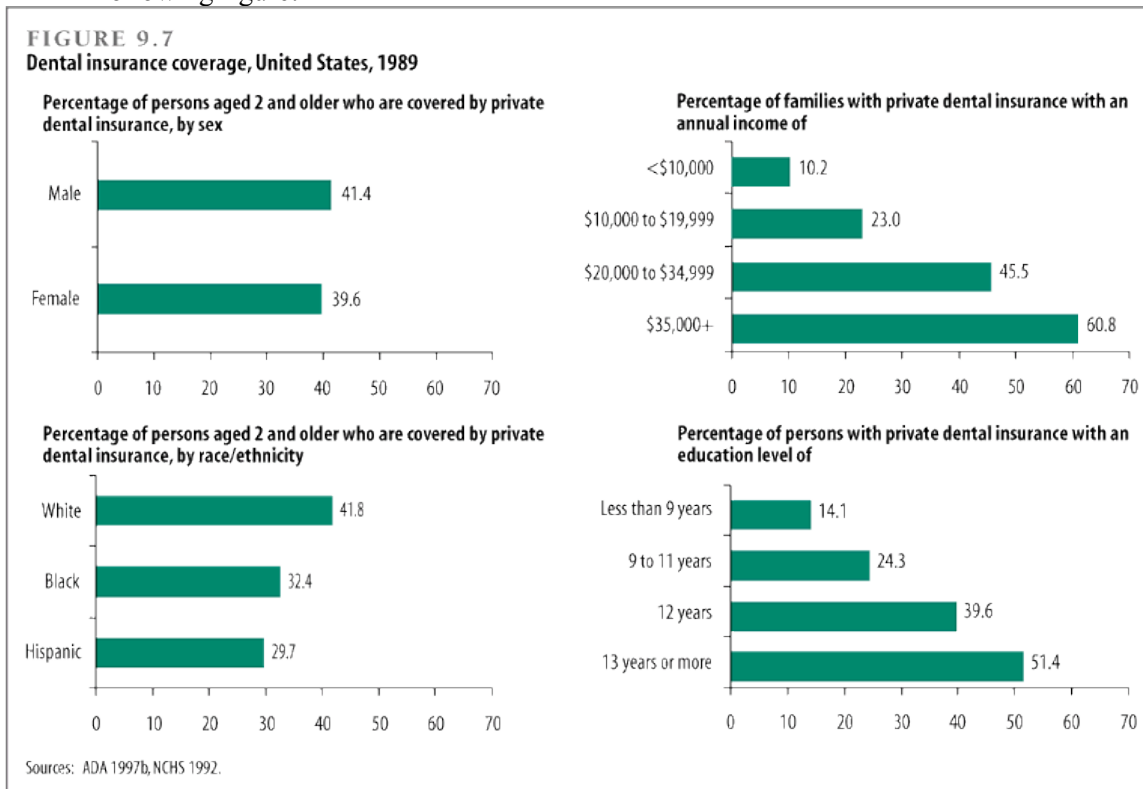
⁶⁶ *The Future of Dentistry Report.* The American Dental Association, 2002.

⁶⁷ Brown, L.J. *Dental Work Force Strategies During a Period of Change and Uncertainty.* Journal of Dental Education, 2001; 65:1404-1416.

⁶⁸ *The Future of Dentistry Report.* The American Dental Association, 2002.

⁶⁹ *The Future of Dentistry Report.* The American Dental Association, 2002.

services.⁷⁰ Barriers to care include cost; lack of dental insurance, public programs, or providers from underserved racial and ethnic groups; fear of dental visits; and limited oral health literacy.⁷¹ Insurance is a major determinant of utilization of dental services and dental coverage varies by race/ethnicity, income, and educational levels. See the following figure.⁷²



The two groups at greatest risk for not accessing dental care and therefore suffering from untreated dental concerns are those living below the federal poverty level and the working poor. See the following graph.⁷³ Both of these groups are comprised of a disproportionate share of African Americans, Hispanics, Native Americans, and recent immigrants.⁷⁴

⁷⁰ *Report of Congressional Requestors. Oral Health in Low-Income Populations.* GAO/HEHS-00-72. U.S. General Accounting Office, 2000.

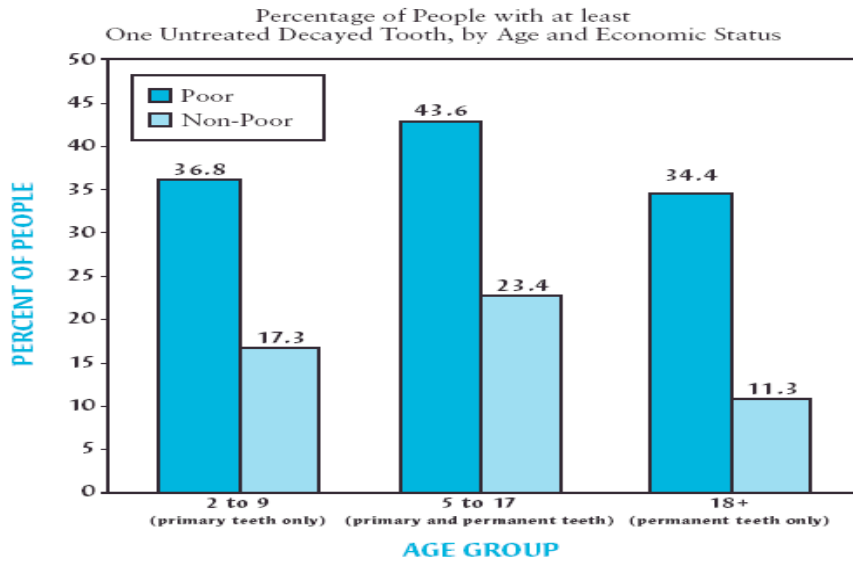
⁷¹ *Healthy People 2010.* United States Department of Health and Human Services, July 2001.

⁷² *Oral Health in America: A Report of the Surgeon General.* United States Department of Health and Human Services, July 2000.

⁷³ *Healthy People 2010.* United States Department of Health and Human Services, July 2001.

⁷⁴ *The Future of Dentistry Report.* The American Dental Association, 2002.

FIGURE 3.1



Although children have the largest percentage their total population visit the dentist annually, they are also a group that creates concern. In 2001, 73.3 percent of those ages 2-17, 64.6 percent of 16-64 year olds and 56.3 percent of those over age 65 reported visiting the dentist within the last year.⁷⁵ However, approximately 4 percent of children aged 2-4, 7 percent of children ages 5-11, and 8 percent of those ages 12-17 have unmet dental needs.⁷⁶ According to the U.S. Surgeon General Report in 2000, dental caries is the single most common chronic disease of childhood, with a prevalence five times greater than asthma. Eighty percent of dental caries in the permanent teeth found in children is concentrated in 25 percent of the child and adolescent population.⁷⁷ Tooth decay (the most common oral health problem of children) is concentrated in low-income, Medicaid eligible children. Medicaid eligible children have three times greater unmet need for dental care than children in higher income families.⁷⁸ Lack of insurance was found to be a more significant barrier to gaining primary care access for dental services for children than either poverty or minority status.⁷⁹ See the following figure.⁸⁰

⁷⁵ *Key Dental Facts*. American Dental Association, September, 2004.

⁷⁶ *Key Dental Facts*. American Dental Association, September, 2004.

⁷⁷ Kaste, LS, Selwitz, RH, Oldakowski, RJ, Brunelle, JA, Winn, DM, Brown, LJ. Coronal caries in the primary and permanent dentition of children and adolescents 1-17 years of age: United States, 1988-1991. *Journal of Dental Research*, 1996; 75:631-641.

⁷⁸ *Oral Health Services*. Health Resources Services Administration. Accessed February 20, 2006, from http://www.hrsa.gov/medicaidprimer/oral_part3only.htm.

⁷⁹ *Oral Health in America: A Report of the Surgeon General*. United States Department of Health and Human Services, July 2000.

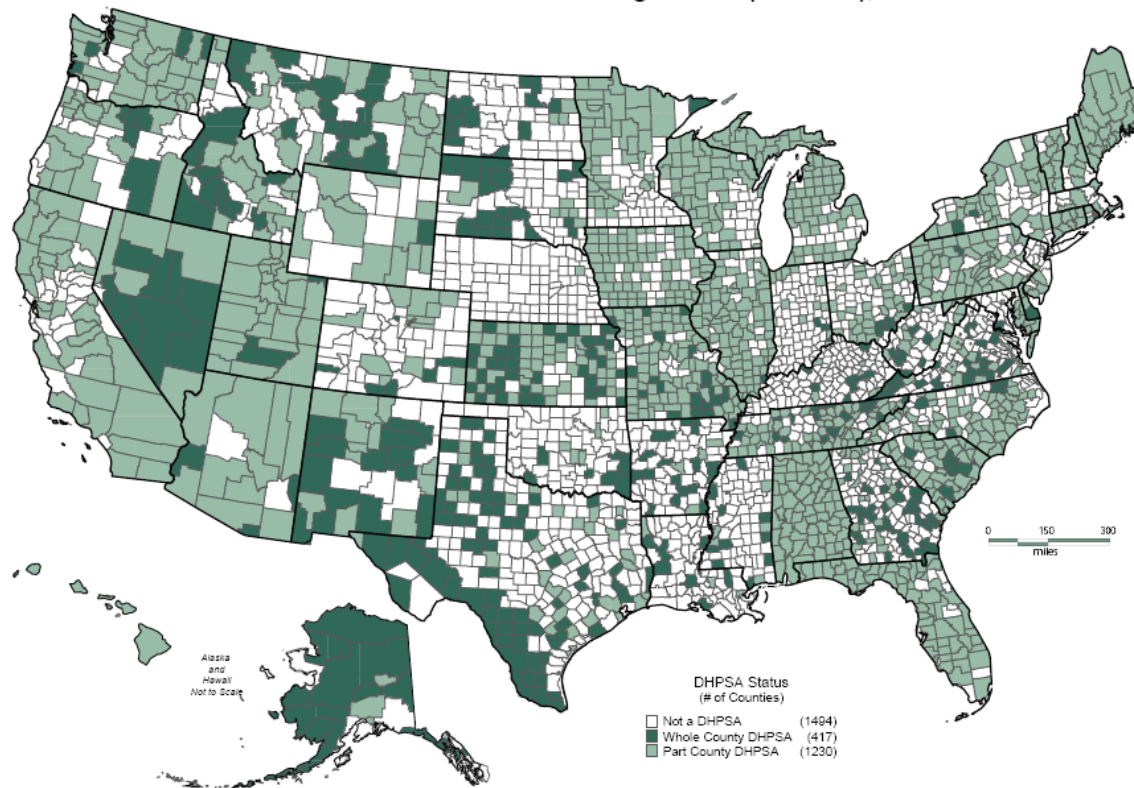
⁸⁰ *State and Community Models for Improving Access to Dental Care for the Underserved – A White Paper*. American Dental Association, October, 2004.

Table 1; Dental visits by children 2 to 18 years old, by poverty level - 2001 MEPS

Poverty Level	% with a Dental Visit	Number	Percent of Population
< 100% FPL	28.7%	11,154,372	16.2%
100 to < 125%	26.4%	3,665,657	5.3%
125 to < 200%	38.1%	11,144,188	16.2%
200 to <400%	49.4%	22,506,398	32.7%
>= 400%	65.2%	20,357,458	29.6%

- Geographic Distribution of Dental Professionals:* There are pronounced geographic imbalances in the dental workforce. In 2000 it was reported that an estimated 25 million individuals reside in areas lacking adequate dental care services, as defined by Health Professional Shortage Area (HPSA) criteria. See the following map for Dental Health Professional Shortage Areas nationally.⁸¹

Dental Health Professional Shortage Areas (DHPSAs), 2004

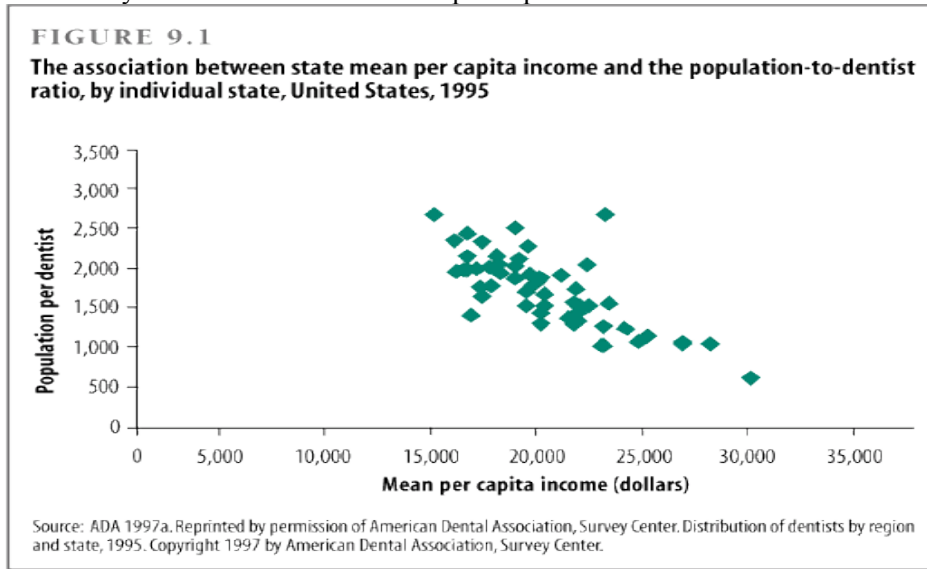


Note: A part county HPSA is one or several sub-county areas designated as a HPSA.
 Produced By: Southeast Regional Center for Health Workforce Studies, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

Some factors that may contribute to the poor distribution of dental professionals are high rates of retirement, shifts in the United States population, rapid growth in state population, and income level of the population. Additionally, the size, number, and location of dental practices are important determinants of availability of care and

⁸¹ *Dental Health Professional Shortage Areas (DHPSAs)*. Accessed February 20, 2006, from <http://www.healthworkforce.unc.edu/maps/dhpsa04.pdf>.

accessibility to services. See the following figure showing the association between the availability of dentists and state mean per capita income.⁸²



In the late 1990s, Minnesota reported the greatest negative percent change in the dentist to population ratio. The Minnesota dentist-to-population ratio has decreased from one dentist per 1,488 population in the 1980s to one dentist per 1,670 population currently.⁸³ See the following figure.⁸⁴

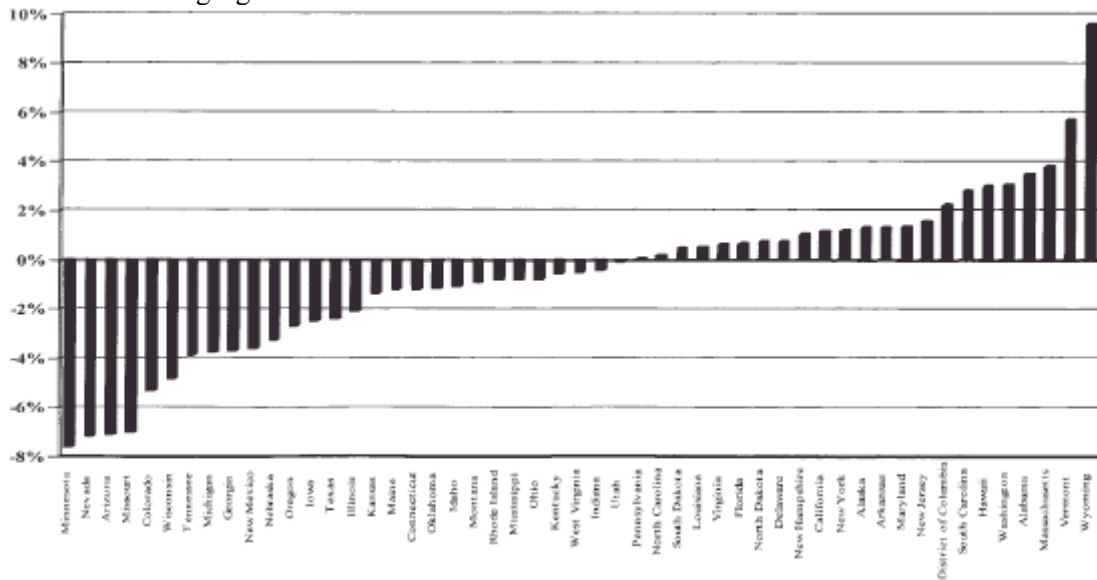


Figure 7. Percentage change in the dentist-to-population ratio, by state, 1993-99

⁸² *Oral Health in America: A Report of the Surgeon General*. United States Department of Health and Human Services, July 2000.

⁸³ DiAngelis, A. *Increasing Demand, Decreasing Access – A Ringside Seat*. *Minnesota Medicine*, 2005. Accessed February 20, 2006, from <http://www.mmaonline.net/publications/MNMed2005/August/DiAngelis.html>.

⁸⁴ Brown, L.J. *Dental Work Force Strategies During a Period of Change and Uncertainty*. *Journal of Dental Education*, 2001; 65:1404-1416.

The following table presents the current distribution of dentists in Minnesota.⁸⁵

Minnesota Region	Estimated Dentists per 100,000 Residents*
Northwest	52
Northeast	64
North Central	48
West Central	62
East Central	46
Southwest	50
Southeast	64
Twin Cities Region	69
Statewide Statistic	63
* Estimate based on county Census 2000 data and a weighted count of dentists by region of primary practice that includes a calculation of survey non response.	

- Dental Benefits:* In 2002, \$70.3 billion was spent on dental services. This represents an increase of 121.8 percent since 1980 (adjusted for inflation).⁸⁶ The average amount spent for dental services per person in 2002 was \$246, up from \$217 in 2000. Total personal health care costs accounted for by dental services was 5.2 percent in 2002.⁸⁷ Dental service expenditures were expected to grow 60.2 percent through the years 2003-2013. This is compared to 74.8 percent growth for physician services and 67.4 percent for hospital services.⁸⁸

While spending for dental services in the United States has risen steadily, dental insurance coverage has not increased. Only 44 percent of persons in the United States have some form of private dental insurance (most with limited coverage and with high co-payments), 9 percent have public dental insurance (Medicaid and Children's Health Insurance Program), 2 percent have other dental insurance, and 45 percent have no dental insurance.⁸⁹ Even though in 2003, 74.3 percent of private practice dentists report providing services at a reduced rate or free of charge, the public health infrastructure for oral health remains insufficient to address the needs of disadvantaged groups.^{90,91} Only 4 percent of dental care costs, is financed publicly (largely through federal-state Medicaid programs), compared to 32.2 percent for medical care. See the following graph showing funding for dental services.⁹²

⁸⁵ *Workforce Demographics for Minnesota Dentists.* Office of Rural Health and Primary Care Minnesota Department of Health, April 2003.

⁸⁶ *Key Dental Facts.* American Dental Association, September, 2004.

⁸⁷ *Key Dental Facts.* American Dental Association, September, 2004.

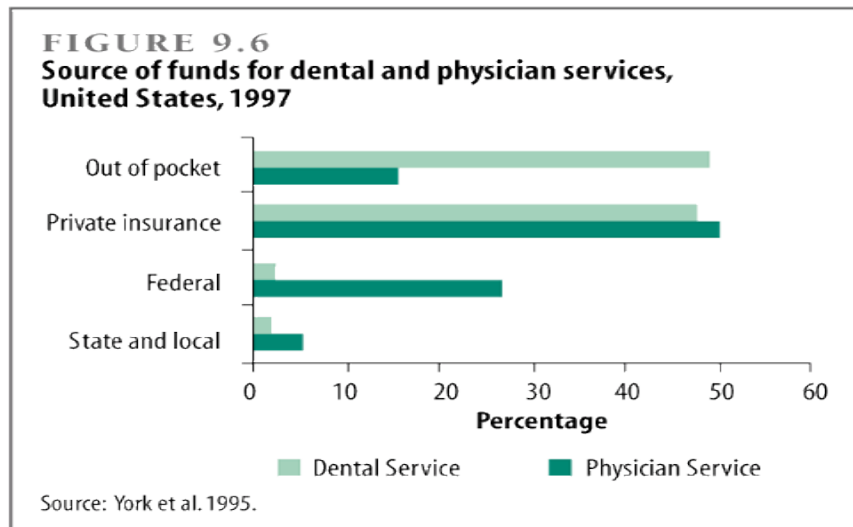
⁸⁸ *Key Dental Facts.* American Dental Association, September, 2004.

⁸⁹ *Healthy People 2010.* United States Department of Health and Human Services, July 2001.

⁹⁰ *State and Community Models for Improving Access to Dental Care for the Underserved – A White Paper.* American Dental Association, October, 2004.

⁹¹ *Oral Health in America: A Report of the Surgeon General.* United States Department of Health and Human Services, July 2000.

⁹² *Oral Health in America: A Report of the Surgeon General.* United States Department of Health and Human Services, July 2000.



Groups eligible for public funding of dental services through Medicaid and SCHIP include: children under age 21 enrolled in Medicaid, children living with incomes below 200 percent of the Federal Poverty Limit, disabled individuals, and some low-income adults and low-income elderly. These programs are hard pressed to sustain the efforts to improve oral health access that were started in the late 1990s.⁹³ This is demonstrated by an increasing number of states who have cut or limited dental coverage as an effort to control spiraling Medicaid costs. As of 2003, at least two states eliminated dental coverage for adults entirely, two states eliminated coverage for dentures, one state eliminated all but basic restorative coverage, and one state imposed an annual per person limit of \$600 on dental services.⁹⁴ Reductions in public funding programs further limit access to dental services and increase disparities in oral health among the nation's sickest and most vulnerable citizens.

There are currently 108 million children and adults without dental insurance in the United States, more than two and a half times the number of people without health insurance.⁹⁵ Higher medical costs have led to more defined contribution programs, greater employee cost sharing, increased service limitations and restrictions, and reduction in coverage for retirees. These changes have impacted the use and coverage of dental services provided by employers.⁹⁶ Additionally, most elderly lose their dental insurance when they retire and Medicare does not pay for routine dental care. In 1995, 79 percent of people over age 65 paid for dentist visits out of their own pocket.⁹⁷

- *Aging US population:* As baby boomers age, their demand for dental services is anticipated to grow. They will require more care than past generations did because they have lost fewer teeth due to overall improvements in oral health. This trend in improved

⁹³ *Improving Oral Health: Promises and Prospects.* National Health Policy Forum, June 2003.

⁹⁴ *Improving Oral Health: Promises and Prospects.* National Health Policy Forum, June 2003.

⁹⁵ *Improving Oral Health: Promises and Prospects.* National Health Policy Forum, June 2003.

⁹⁶ *The Future of Dentistry Resort.* The American Dental Association, 2002.

⁹⁷ *The Oral Health of Older Americans.* Centers for Disease Control and Prevention, March 2001.

Accessed January 14, 2006 from <http://www.cdc.gov/nchs/data/agingtrends/03oral.pdf>.

oral health among people aged 65 is expected to continue as the new members of the elderly age groups are more likely to have higher education levels and be more affluent.⁹⁸ Additionally in the same population, there has been a marked increase in the demand for restorative treatments, again due to better preventive care.⁹⁹ The demand for cosmetic dental services has also been increasing in recent years.¹⁰⁰ In summary, as the population ages, there will be greater number of teeth to care for, more teeth will be at risk for dental caries, and people are more likely to need artificial teeth and dentures.^{101,102} The growing elderly population in the United States will also bring new challenges to the dental workforce. Dentists will find themselves having to interact with other health care providers, social service agencies, and institutionalized patients. Additionally, to meet the demands of the aging population, the entire health care delivery system might shift and create changes in the services dentists provide to the population.¹⁰³

- *Dental School Graduates:* In 2004, there were 56 accredited dental schools in the United States.¹⁰⁴ The total number of dental school graduates in 2003 was 4,369.¹⁰⁵ Thirty-nine percent were female and 35 percent were nonwhite.¹⁰⁶ It is predicted with the growing population in the United States, 55 percent of that growth will be the result of immigrants and their descendants.¹⁰⁷ While recent trends have indicated the more nonwhites are enrolling in dental school, the racial and ethnic distribution of dentists will not represent the demographics of the larger population they are trying to serve.¹⁰⁸ There is concern that a non-representative dental workforce may lead to greater disparities in dental care. Female dental graduates are more likely than their male counterparts to be working part-time one year out of dental school (16.3 percent compared to 8.6 percent).¹⁰⁹ It is estimated forecasted that 29.2 percent of active private practitioners will be female by 2020. The question remains of how demographic shifts will affect the future of the dentistry workforce. See the following figure.¹¹⁰

⁹⁸ *The Oral Health of Older Americans.* Centers for Disease Control and Prevention, March 2001. Accessed January 14, 2006 from <http://www.cdc.gov/nchs/data/agingtrends/03oral.pdf>.

⁹⁹ *Dentist Workforce Profile.* Office of Rural Health and Primary Care Minnesota Department of Health, February, 2002.

¹⁰⁰ *Dentist Workforce Profile.* Office of Rural Health and Primary Care Minnesota Department of Health, February, 2002.

¹⁰¹ Valachovic, R.W., Weaver, R.G., Sinkford, J.C., Haden, N.K. *Trends in Dentistry and Dental Education.* Journal of Dental Education, 2001; 65:539-561.

¹⁰² *Healthy People 2010.* United States Department of Health and Human Services, July 2001.

¹⁰³ *The Future of Dentistry Report.* The American Dental Association, 2002.

¹⁰⁴ *Dental Education at a Glance.* American Dental Education Association, 2004.

¹⁰⁵ *Distribution of Dentists in the United States by Region and State.* American Dental Association, May, 2005.

¹⁰⁶ *Key Dental Facts.* American Dental Association, September, 2004.

¹⁰⁷ Brown, L.J. *Dental Work Force Strategies During a Period of Change and Uncertainty.* Journal of Dental Education, 2001; 65:1404-1416.

¹⁰⁸ *Workforce Demographics for Minnesota Dentists.* Office of Rural Health and Primary Care Minnesota Department of Health, April 2003.

¹⁰⁹ *The 2004 Survey of Dental Graduates.* American Dental Association, July 2005.

¹¹⁰ Brown, L.J. *Dental Work Force Strategies During a Period of Change and Uncertainty.* Journal of Dental Education, 2001; 65:1404-1416.

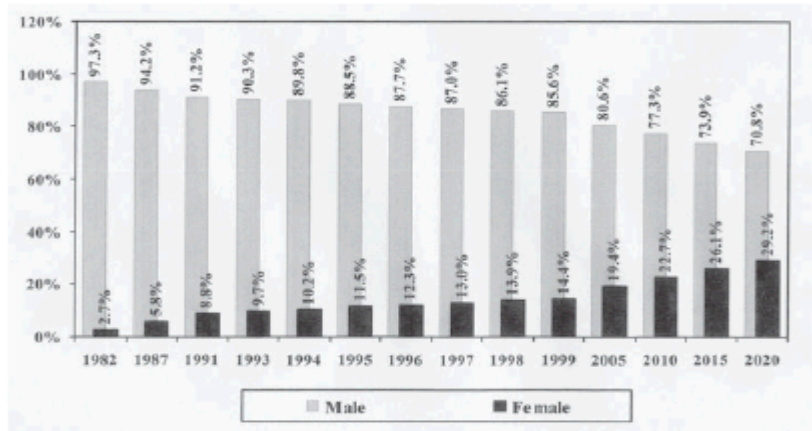


Figure 5. Percent distribution of active private practitioners in the United States, by gender

The average educational debt of dental school graduates in 2003 was \$122,209. This is up approximately 25 percent from 1999.¹¹¹ The increase in educational debt has been found to affect both career choice and practice location of dentists.¹¹²

- Lifestyle of Working Dentists:* The advancing average net income of full-time dentists is contributing the increasing interest in dentistry as a career. The average net income of solo, full-time, dentists in private practice increased over 89% between 1990 and 2000.¹¹³ The hourly net income of dentists now exceeds that of family physicians, general internists, and pediatricians. Specialists salaries are higher than general practitioners, (\$270,790 compared to \$159,550).¹¹⁴

In 2001, employed private practitioners spent an average of 31.2 hours per week in practice, and 29.3 of these hours on average were spent treating patients.¹¹⁵ This represents a decrease in the average hours spent per week treating patients. In 1997, these figures were 34.7 and 32.2 respectively.¹¹⁶ The majority of dentists work full time, however there has been a trend toward increased part-time work. In 1982 only 14.2 percent of dentists worked part time, compared with 23.8 percent in 1995.¹¹⁷ This may in part be due to the increasing number of female dentists. About 30 percent of women dentists and 15 percent of male dentists indicate they work part time.¹¹⁸ Although there has been an increase in the overall numbers of dentists in recent years, because of the changes in the lifestyles of dentists, the American Dental Association reported only “modest gains in the total number of office hours and the total number of treatment hours available to address the dental care needs of all Americans.”¹¹⁹

¹¹¹ *The 2004 Survey of Dental Graduates.* American Dental Association, July 2005.

¹¹² *Oral Health in America: A Report of the Surgeon General.* United States Department of Health and Human Services, July 2000.

¹¹³ *Dental Education at a Glance.* American Dental Education Association, 2004.

¹¹⁴ *Dental Education at a Glance.* American Dental Education Association, 2004.

¹¹⁵ *2002 Survey of Dental Practice.* American Dental Association, May 2004.

¹¹⁶ *2002 Survey of Dental Practice.* American Dental Association, May 2004.

¹¹⁷ Mertz, E., O’Neil, E. *The Growing Challenge of Providing Oral Health Care Services to All Americans.* Health Affairs, 2002; 21:65-77.

¹¹⁸ Brown, L.J. *Dental Work Force Strategies During a Period of Change and Uncertainty.* Journal of Dental Education, 2001; 65:1404-1416.

¹¹⁹ Mertz, E., O’Neil, E. *The Growing Challenge of Providing Oral Health Care Services to All Americans.* Health Affairs, 2002; 21:65-77.

- Allied Dental Personnel:* Future employment of dentists is not expected to grow as rapidly as the demand for dental services. As the practice expands, dentists are likely to hire more dental hygienists and dental assistants to handle routine services.¹²⁰ The predicted rate of growth in new jobs for dentists between the years 2000-2010 was 5.7 percent, compared to 37.1 percent for dental hygienists.¹²¹ Dental hygienists increase the productivity of the dental workforce and extend accessibility of oral health care.¹²² It is likely that in the future dental hygienist will be used for preventive and basic restorative cares so dentists can concentrate on more specialized and highly reimbursable procedures.¹²³ Current workforce and enrollment trends indicate a strong demand for dental hygienists that is predicted to continue. Between 1989 and 2002, enrollment in dental hygiene programs increased nearly 30%.¹²⁴ In 2004, dental hygienists held about 158,000 jobs. Because multiple jobholding is common in this field, the number of jobs exceeds the number of hygienists.¹²⁵

It is important to note however that the increasing number of dental hygienists may not be a completely effective method to meet high demands of dental services. Hygienists can be faced with barriers such as complex licensure processes, differences among acceptable practice duties among states, and varying compensation that limit their geographic mobility.¹²⁶

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Reviewed and approved by Patrick Lloyd, DDS, MS, Dean, University of Minnesota School of Dentistry; Health Professions Workforce Taskforce member

¹²⁰ *Occupational Outlook Handbook 2004-2005 Edition*, Bureau of Labor Statistics U.S. Department of Labor. Accessed February 15, 2006, from <http://www.bls.gov/oco/ocos072.htm>.

¹²¹ Mertz, E., O'Neil, E. *The Growing Challenge of Providing Oral Health Care Services to All Americans*. Health Affairs, 2002; 21:65-77.

¹²² *Dental Education at a Glance*. American Dental Education Association, 2004.

¹²³ Mertz, E., O'Neil, E. *The Growing Challenge of Providing Oral Health Care Services to All Americans*. Health Affairs, 2002; 21:65-77.

¹²⁴ *Dental Education at a Glance*. American Dental Education Association, 2004.

¹²⁵ *Occupational Outlook Handbook 2004-2005 Edition*, Bureau of Labor Statistics U.S. Department of Labor. Accessed February 15, 2006, <http://www.bls.gov/oco/ocos097.htm>.

¹²⁶ *The Future of Dentistry Report*. The American Dental Association, 2002.

Appendix D: Workforce Trends

D.2. Six Health Professions Overview(continued)

A National and State Perspective on the Physician Workforce

Executive Summary

Trends with Implications for Enrollment Decisions

National

- Nationally, physicians and surgeons held about 567,000 jobs in 2004. In 2003, 40 percent of physicians were in primary care and 60 percent were involved in specialties.¹²⁷
- In 1980, GMENAC (Graduate Medical Education National Advisory Committee) established a ratio of 171 physicians per 100,000 people as an adequate standard.¹²⁸ In 2003, there were approximately 281 non-federal physicians for every 100,000 people.¹²⁹
- The number of physicians is forecasted to rise from 283 per 100,000 population in 2000 to 301 in 2015, and then fall to 298 in 2020. This drop is due to the rate of population growth exceeding the rate of growth in the number of physicians after 2015.¹³⁰
- The American Medical Association (AMA) and the Association of American Medical Colleges (AAMC) have taken the position that the previously feared surpluses are unlikely. Additionally, the Council on Graduate Medical Education (COGME) has declared that shortages are the issue.¹³¹
- It is estimated that by 2020, 60% of medical students and 45% of practicing physicians will be women.¹³² Women on average practice 20% to 25% less than men and tend to choose specialties in which time commitments are more readily controllable, a particular problem facing the surgical disciplines.¹³³
- In 2001, foreign trained physicians accounted for 24.5 percent of total physician population, 23.6 percent of all physicians in residency/fellowship training, and 32.9 percent of all hospital-based, full-time physician staff.¹³⁴
- The growing elderly population is particularly important in the context of the physician workforce. It is known that age-specific per capita physician utilization rates change along with demographics.¹³⁵

¹²⁷ *Occupational Outlook Handbook 2004-2005 Edition*, Bureau of Labor Statistics U.S. Department of Labor, <http://www.bls.gov/oco/ocos074.htm>. Accessed December 13th, 2005.

¹²⁸ **Physician Workforce and Graduate Medical Education in the United States of America Statement of Principles.** *American College of Physicians-American Society of Internal Medicine. October 2000.*

¹²⁹ *Trends and Indicators in the Changing Health Care Marketplace.* Kaiser Family Foundation, <http://www.kff.org/insurance/7031/ti2004-5-7.cfm>. Accessed December 22, 2005.

¹³⁰ *Physician Workforce Policy Guidelines for the United States, 2000-2020.* U.S. Department of Health and Human Services, January 2005.

¹³¹ Cooper, R. *Weighing the Evidence for Expanding Physician Supply.* *Annals of Internal Medicine*, 2004; 141:705-714.

¹³² Cooper, R. *Weighing the Evidence for Expanding Physician Supply.* *Annals of Internal Medicine*, 2004; 141:705-714.

¹³³ Evans, S., Sarani, B. *The Modern Medical School Graduate and General Surgical Training.* *Archives of Surgery*, 2002; 137: 274-277.

¹³⁴ Hallock, J. A., Seeling, S. S., Norcini, J. J. *The International Medical Graduate Pipeline.* *Health Affairs*, 2003; 22: 94-96.

- Relationships have been observed between the rate of economic expansion and the growth of health care services in the United States. Economic expansion greatly influences medical specialties, whereas the surgical and hospital-based specialties are affected to a lesser degree, and levels of economic expansion have little influence on family/general practice.¹³⁶
- Factors influencing supply and demand: growth of non-physician care providers, changing lifestyles of physicians, growing number of female physicians, number of student choosing to go into medicine, time required to educate and train physicians, international medical school graduates

Minnesota

- Using the July 1, 2004 population estimate for Minnesota, there were 218 active physicians per 100,000 people.¹³⁷
- Primary care physicians represent the greatest proportion of physicians practicing in Minnesota. In 2003, Minnesota had 76 active primary care physicians per 100,000 population, higher than the national ratio of 69.¹³⁸
- The distribution of physicians by specialty in 2003 for all of Minnesota is as follows: 50.8% in primary care, 9.3% in medical specialties, 10.3% in surgical specialties, and 29.5% in other specialties.¹³⁹
- Seven of the ten top vacancy rates in Minnesota are in specialties.
- The average age of physicians in Minnesota has remained relatively constant at age 46. Physicians in rural Minnesota tend to be slightly older than those in urban Minnesota.
- As the population grows in Minnesota, the decrease in the ratio of physicians per population will be greater in metropolitan areas than in rural areas because of the larger projected population growth.¹⁴⁰

University of Minnesota Medical School Facts and Figures

- In 2005, the average indebtedness of graduates of the University of Minnesota was \$132,988.¹⁴¹ Also in 2005, Minnesota was identified as the most expensive of 74 American public medical colleges for resident tuition and fees, at \$29,638 for first-year students.¹⁴²
- There has been an application increase to the doctor of medicine program on the Duluth campus since 2003 from 458 to 954. Similarly, the Twin City applicant pool has increased since 2002 at 1645 to 2285 in 2005.

¹³⁵ *Physician Workforce Policy Guidelines for the United States, 2000-2020*. U.S. Department of Health and Human Services, January 2005.

¹³⁶ Cooper, R. A., Getzen, T. E., Laud, P. *Economic Expansion Is a Major Determinant of Physician Supply and Utilization*. Health Services Research, 2003; 38: 675-696.

¹³⁷ *Minnesota Physician Facts and Data 2004*. Minnesota Department of health Office of Rural Health and Primary Care. 2004.

¹³⁸ *The Minnesota Health Workforce: Highlights from the Health Workforce Profile*. U.S. Department of Health and Human Services Bureau of Health Professions, 2004.

¹³⁹ *Distribution of Minnesota Physicians by Practice Location and Specialty*. Minnesota Department of Health Office of Rural Health and Primary Care, 2003.

¹⁴⁰ Buck, S. T., Trauba, V., Christensen, R. G. *Minnesota Physician Workforce Analysis Rural Supply and Demand*. Minnesota Medicine. Accessed December 22, 2005 from <http://www.mmaonline.net/publications/MNMed2004/September/Buck.html>

¹⁴¹ Medical Education Debt Management. Accessed December 22, 2005 from <https://www.meded.umn.edu/financial/debt.cfm>.

¹⁴² *Debt Weighs on Medical Students*. Pioneer Press. Accessed December 22, 2005 from <http://www.twincities.com/mld/twincities/news/12969961.htm>

- More matriculates in the Duluth program are from Minnesota (91.5% average) compared to a 75% average in the Twin Cities medical school program.
- There is not much diversity in the Minnesota Medical School. About 89% of medical students in Duluth are white, while there is greater diversity in the Twin City program with an average of 78% white. The diversity in the Twin Cities has maintained the average level, while in the Duluth students in 2004, the average white matriculates was 98%, clearly above the average.
- Since 2002, there has been an even gender mix for male and female matriculates in both programs.
- An average of 51% to 58% of Medical School graduates decide to maintain residence in Minnesota and to fulfill residency program requirements in the state.
- Physician residency programs offered at the University of Minnesota take 3 to 9 years to complete.
- A large number of physicians apply to the emergency medicine residency programs offered through the University in conjunction with Hennepin County Medical Center (HCMC) and Regions Hospital (669 total for 2005).
- The emergency medicine residency programs enroll up to 20 physicians whereas the family medicine and community health program allows up to 43 residents in one year from an applicant pool of 285 to 491 physicians.

Researched and compiled by: Kaia Sjogen, Masters of Public Health candidate, School of Public Health and Christine Bartels, PhD Candidate, Social and Administrative Pharmacy Graduate Program; graduate research assistants, Academic Health Center Office of Education

Appendix D: Workforce Trends

D.2. Six Health Professions Overview(continued)

A National and State Perspective on the Nursing Workforce

Executive Summary Trends with Implications for Enrollment Decisions

National

- As the largest healthcare occupation, registered nurses held about 2.3 million jobs nationally in 2002. Almost 3 out of 5 jobs were in hospitals, in inpatient and outpatient departments. About one in five RNs worked part time.¹⁴³
- For the first time, the U.S. Department of Labor has identified Registered Nursing as the top occupation in terms of job growth through the year 2010.¹⁴⁴
- By 2020, 44 States and the District of Columbia are projected to have shortages.¹⁴⁵ By 2012, more than one million new and replacement nurses will be needed.
- In 2000, the average age of the working registered nurse was 43.3, up from 42.3 in 1996.¹⁴⁶
- Women continue to make up 94 percent of the nursing workforce.
- Nursing school enrollment has been on the rise in recent years. 2004 was the fourth consecutive year of enrollment increases with 16.6, 8.1, and 3.7 percent increases in 2003, 2002, and 2001, respectively.¹⁴⁷ However, “because the number of young RNs has decreased so dramatically over the past two decades, enrollments of young people in nursing programs would have to increase at least 40 percent annually to replace those expected to leave the workforce through retirement.”¹⁴⁸
- 26,340 qualified applications to entry-level baccalaureate programs were not accepted in 2004. The primary barriers to accepting all qualified students at nursing colleges and universities are insufficient faculty, clinical placement sites, and classroom space.¹⁴⁹
- Job dissatisfaction among hospital nurses is four times greater than the average for all US workers.¹⁵⁰ Forty percent of hospital nurses have burnout levels that exceed the norm for health care workers.¹⁵¹

¹⁴³ *Occupational Outlook Handbook 2004-2005 Edition*, Bureau of Labor Statistics U.S. Department of Labor, <http://www.bls.gov/oco/ocos083.htm>. Accessed November 14th, 2005

¹⁴⁴ *2002-2012 Employment Projections, Monthly Labor Review*. Bureau of Labor Statistics U.S. Department of Labor, February 2004.

¹⁴⁵ *Projected Supply, Demand, and Shortages of Registered Nurses: 2000-2020*. Bureau of Health Professions National Center for Health Workforce Analysis, July 2002

¹⁴⁶ *National Sample Survey of Registered Nurses*. Bureau of Health Professions U.S. Department of Health and Human Services, March 2000.

¹⁴⁷ *Nursing school enrollment increases are moderating*. Minnesota Hospital Association. <http://www.mnhospitals.org/index/pi-app/issue.40>. Accessed January 6, 2006.

¹⁴⁸ Buerhaus, PI, Staiger, DO, Auerbach DI. *Is the Current Shortage of Hospital Nurses Ending?* Health Affairs, 2003; 22: 191-198.

¹⁴⁹ *Enrollment Increases at U.S. Nursing Schools Are Moderating While Thousands of Qualified Students Are Turned Away*. American Association of Colleges of Nursing.

<http://www.aacn.nche.edu/Media/NewsReleases/2004/enr104.htm> Accessed January 6, 2006.

¹⁵⁰ Aiken, LH, Clarke, SP, Sloane, DM, Sochalski, JA, Busse, R, Clarke, H, Giovannetti, P, Hunt, J, Rafferty, AM, Shamian, J. *Nurses' Reports on Hospital Care in Five Countries*. Health Affairs, 2001; 20: 43-53.

- In 2000, 7.3 percent of the national RN population was prepared to practice in an advanced practice role.¹⁵²
- Factors influencing supply and demand for nursing: aging population and workforce, emergence of alternative job opportunities, stressful working conditions

Minnesota

- Nursing is the largest health care occupation in Minnesota representing more than 50,000 jobs.¹⁵³ In May 2005, there were 68,738 registered nurses licensed to practice in Minnesota.¹⁵⁴
- Minnesota had 943 RNs per 100,000 people in 2000, nearly 19 percent above the national ratio of 793.¹⁵⁵
- Minnesota RNs have a higher rate of part-time employment as compared to the rest of the nation (50 percent versus 25 percent).¹⁵⁶
- In 2003, RNs in Minnesota were three years older than those in the rest of the nation (45.4 versus 42.4).¹⁵⁷
- RN vacancies have declined by 42 percent between second quarter 2001 and 2003 in Minnesota.¹⁵⁸
- In Minnesota, the current ratio of baccalaureate-prepared nurses to associate degree-prepared is approximately 1:2, the opposite of the AACN recommendation.¹⁵⁹ Without adequate numbers of baccalaureate prepared nurses, shortages will be noted in nurse practitioners, clinical nurse specialists, nurse anesthetists and midwives, nursing faculty, and nursing researchers.¹⁶⁰
- In Minnesota in 2003, it was estimated that approximately 8,000 RNs (or 15 percent of the workforce) planned to leave the profession in the next two years.¹⁶¹
- In 2000, Minnesota had 1,208 nurse practitioners, or 24.5 per 100,000 population. This rate is much lower than the national rate of 33.7. There were 138 certified nurse midwives in 2000 or 2.8 per 100,000 population. This is comparable to the national rate of 2.9. In 2003, there were 1093 registered nurse anesthetists in Minnesota. Minnesota has one of the highest ratios of nurse anesthetists per capita in the nation.¹⁶²

¹⁵¹ Aiken, LH, Clarke, SP, Sloane, DM, Sochalski, JA, Busse, R, Clarke, H, Giovannetti, P, Hunt, J, Rafferty, AM, Shamian, J. *Nurses' Reports on Hospital Care in Five Countries*. Health Affairs, 2001; 20: 43-53.

¹⁵² *Findings from the National Sample Survey of Registered Nurses*. U.S. Department of Health and Human Services Bureau of Health Professions, March 2000.

¹⁵³ *Findings from the Minnesota Registered Nurse Workforce Survey*. Minnesota Department of Health Office of Rural Health and Primary Care. January 2003.

¹⁵⁴ *Minnesota Registered Nurses Facts and Data 2004*, Minnesota Department of Health Office of Rural Health and Primary Care. 2004.

¹⁵⁵ *Minnesota Registered Nurse Facts and Data*, Minnesota Department of Health, 2004.

¹⁵⁶ *Registered Nurse Workforce Profile*, Minnesota Department of Health Office of Rural Health and Primary Care, January 2001.

¹⁵⁷ *Findings from the Minnesota Registered Nurse Workforce Survey*. Minnesota Department of Health Office of Rural Health and Primary Care, January 2003.

¹⁵⁸ *Healthcare Jobs in Minnesota: Ducking the Jobless Recovery*, Department of Employment and Economic Development, January 2004.

<http://www.deed.state.mn.us/lmi/publications/trends/0104/health.htm>. Accessed November 28, 2005.

¹⁵⁹ Disch, J. *Let's Make Sure We Fix the Right Nursing Shortage*. MN Physician, 2005, 18.

¹⁶⁰ Disch, J. *Let's Make Sure We Fix the Right Nursing Shortage*. MN Physician, 2005, 18.

¹⁶¹ *Findings from the Minnesota Registered Nurse Workforce Survey*. Minnesota Department of Health Office of Rural Health and Primary Care. January 2003.

¹⁶² *The Minnesota Health Workforce: Highlights from the Health Workforce Profile*. U.S. Department of Health and Human Services Bureau of Health Professions, 2004.

University of Minnesota School of Nursing Facts and Figures

- In the past three years, there have been 495 to 537 applications submitted for 127 to 133 enrollment positions in the BSN program.
- Additional trend analysis will be provided in the final report.

Researched and compiled by: Kaia Sjogen, Masters of Public Health candidate, School of Public Health and Christine Bartels, PhD Candidate, Social and Administrative Pharmacy Graduate Program; graduate research assistants, Academic Health Center Office of Education

Appendix D: Workforce Trends

D.2. Six Health Professions Overview(continued)

A National and State Perspective on the Pharmacy Workforce

Executive Summary Trends with Implications for Enrollment Decisions

National

- About 230,000 jobs nationally in 2002. About 62 percent work in community pharmacies that are either independently owned or part of a drugstore chain, grocery store, department store, or mass merchandiser. Twenty percent of salaried pharmacists work in hospitals, and others work in clinics, mail-order pharmacies, pharmaceutical wholesalers, home healthcare agencies, or the Federal Government.¹⁶³ Several national data sets suggest there has been a small decrease in pharmacist shortages in recent years.
- *National Perspective:* The average vacancy rate for pharmacists in 2005 was 6.2 percent. This rate has been trending downward in the last five years and is significantly lower than the peak rate of 8.9 percent in 2000. The Midwest region reports the lowest vacancy rate in the country, at a rate of 4.7 percent.¹⁶⁴
- Perceptions of non-management position shortages have trended downward since 2002. Shortages of experienced frontline pharmacists are perceived to be the highest of all pharmacy positions, at more than 50 percent.¹⁶⁵
- In 2005, the number of prescriptions dispensed is expected to reach four billion nationally. Between 2001 and 2005, the supply of community pharmacists is expected to increase by only 3.9 percent while the number of prescription drugs dispensed will increase by 26 percent.¹⁶⁶ The Pharmacy Manpower Project reported that with conservative drug order growth estimates over the next twenty years about 100,000 pharmacists would be needed in 2020 for order fulfillment functions. This can be compared to the 135,000 pharmacists currently working in this capacity. The projected need is lower than one may expect despite significant projected increases in medication utilization because of advances in technology and automated filling systems.¹⁶⁷ In 2005, the number of prescriptions dispensed is expected to reach four billion nationally. Between 2001 and 2005, the supply of community pharmacists is expected to increase by only 3.9 percent while the number of prescription drugs dispensed will increase by 26 percent.¹⁶⁸ The Pharmacy Manpower Project reported that with conservative drug order growth estimates over the next twenty years about 100,000 pharmacists would be needed in 2020 for order fulfillment functions. This can be compared to the 135,000 pharmacists currently working in this capacity. The projected need is lower than one may expect despite

¹⁶³ *Occupational Outlook Handbook 2004-2005 Edition*, Bureau of Labor Statistics U.S. Department of Labor, <http://www.bls.gov/oco/ocos079.htm>. Accessed November 3rd, 2005.

¹⁶⁴ *2005 ASHP Pharmacy Staffing Survey*, American Society of Health System Pharmacists, 2005.

¹⁶⁵ *2005 ASHP Pharmacy Staffing Survey*, American Society of Health System Pharmacists, 2005

¹⁶⁶ Pal S. Prescription Sales Surpass \$182 Billion in 2002. *U.S. Pharmacist*, 2003; 28. Posted on 10/15/03.

¹⁶⁷ *Professionally Determined Need for Pharmacy Services in 2020*. The Pharmacy Manpower Project, Inc. October 2004.

¹⁶⁸ Pal S. Prescription Sales Surpass \$182 Billion in 2002. *U.S. Pharmacist*, 2003; 28. Posted on 10/15/03.

significant projected increases in medication utilization because of advances in technology and automated filling systems.¹⁶⁹

- Factors influencing supply and demand: growth in the use of prescription drugs; expansion of pharmacist's role in the healthcare settings; increase in the number of female pharmacists in the workplace; inefficiencies in the workplace, technology, Medicare medication therapy management, increased demand for pharmacists in regulatory roles.

Minnesota

- In January 2005, the National Association of Chain Drug Stores reported a moderate shortage of pharmacists nationally, continuing an ongoing trend of moderate need documented since January 2003. Minnesota fell within this moderate need category in 2005 as well, with shortages noted in the following geographic areas: Burnsville, New Ulm, Thief River Falls, non-metro areas, and southern MN.¹⁷⁰
- In June 2005, the ADI (sp) index reported a slight to moderate demand for pharmacists, roughly equivalent to the same index measure in 2004. Minnesota demand on this index in 2005 indicated less demand than the national average, yet not a market where supply is equivalent to demand.¹⁷¹
- In 2002, Minnesota was declared the number one state of pharmacist need.¹⁷² The Minnesota Department of Employment and Economic Development estimates pharmacist vacancy rates ranging from 2.3 percent in 2002 downward to 1.1 percent in 2004.¹⁷³
- Rural pharmacies in Minnesota have a higher vacancy rate and face greater hiring difficulties than those located in urban areas. Nearly half of all rural pharmacies with vacancies have been trying to fill their positions for more than 10 months, compared to only 30 percent of pharmacies in urban counties.¹⁷⁴
- There are a total of 6,179 active pharmacists in Minnesota. Slightly more than half of all total active pharmacists are men (52%). Males tend to share similar numbers of employment in greater Minnesota (1,215) and in the seven-county metro area (1,275). Females, on the other hand, are much more likely to work in the seven-county metro area (1,441) than in greater Minnesota (789).¹⁷⁵ Pharmacists working in rural Minnesota are on average four years older than their urban colleagues.¹⁷⁶
- Between 1996 and 2002, 189 pharmacies closed in Minnesota; 102 in rural areas; 87 in the Metro area.

University of Minnesota College of Pharmacy Facts and Figures

- XX % of practicing pharmacists are graduates of the University of Minnesota
- Trends in enrollments since 1980
- Since 2000, an average 77.5% of the COP classes has been Minnesota residents.

¹⁶⁹ *Professionally Determined Need for Pharmacy Services in 2020*. The Pharmacy Manpower Project, Inc. October 2004.

¹⁷⁰ *Chain Pharmacy Employment Survey*. National Association of Chain Drug Stores, January 2005.

¹⁷¹ Aggregate Demand Index, <http://www.pharmacymanpower.com/>. Accessed November 3rd, 2005.

¹⁷² *Journal of the American Pharmacists Association*. American Pharmacists Association. 2002

¹⁷³ *Facts and Data on Minnesota Pharmacies, Pharmacists, and Pharmacy Technicians*. Minnesota Department of Health Office of Rural Health and Primary Care. 2004.

¹⁷⁴ *Profile of Pharmacies in Rural Minnesota*. Minnesota Department of Health Office of Rural Health and Primary Care. October 2003.

¹⁷⁵ *Minnesota Board of Pharmacy Statistics*. Minnesota Board of Pharmacy. April 2005.

¹⁷⁶ *Profile of Pharmacies in Rural Minnesota*. Minnesota Department of Health Office of Rural Health and Primary Care. October 2003

- From 2000 to 2002, an average of 75%, of the 568, 426, or U of MN School of Pharmacy graduates established practices in Minnesota. ? distribution or type of practice
- In 2005 the number of applicants to the College of Pharmacy has increased by 2.9 times when compared to 2000. Some of this increase is likely due to the increase interest in pharmacy because of the workforce shortage and to the new national application process. The number of qualified applicants has nearly doubled during the same time. The number of accepted students has risen from 105 to 156 during the same time, due to the opening of the Duluth branch program..
- Of the 797 pharmacy students who matriculated between 2000 and 2005, 239 (29.9%) were/are male; 60.1%, 558,, female. 78.4%, or 625 students are classified as “white or Caucasian” and the remaining are “minority or unknown”.
- Tuition and fees have increased XX% between 2000 and 2005.
- The average 2005 College of Pharmacy graduate debt load was \$92.697.

625 – white
797

**University of Minnesota Academic Health Center
Workforce Taskforce**

A National and State Perspective on the Pharmacy Workforce

National Pharmacy Workforce Summary

According to the Bureau of Labor Statistics, pharmacists held about 230,000 jobs nationally in 2002. About 62 percent work in community pharmacies that are either independently owned or part of a drugstore chain, grocery store, department store, or mass merchandiser. Twenty percent of salaried pharmacists work in hospitals, and others work in clinics, mail-order pharmacies, pharmaceutical wholesalers, home healthcare agencies, or the Federal Government.¹⁷⁷

Several national data sets suggest there has been a small decrease in pharmacist shortages in recent years. For example:

- In January 2005, the National Association of Chain Drug Stores reported a moderate shortage of pharmacists nationally, continuing an ongoing trend of moderate need documented since January 2003. Minnesota fell within this moderate need category in 2005 as well, with shortages noted in the following geographic areas: Burnsville, New Ulm, Thief River Falls, non-metro areas, and southern MN.¹⁷⁸
- In June 2005, the ADI (sp) index reported a slight to moderate demand for pharmacists, roughly equivalent to the same index measure in 2004. Minnesota demand on this index in 2005 indicated less demand than the national average, yet not a market where supply is equivalent to demand.¹⁷⁹

Despite the small changes reflected in these data, there is a continued unmet demand for pharmacists throughout the United States. Although more states are moving toward having an adequate supply of pharmacists, a large majority of the country's population live in states where it is moderately difficult to fill pharmacist vacancies¹⁸⁰.

Vacancy Rates

National Perspective: The average vacancy rate for pharmacists in 2005 was 6.2 percent. This rate has been trending downward in the last five years and is significantly lower than the peak rate of 8.9 percent in 2000. The Midwest region reports the lowest vacancy rate in the country, at a rate of 4.7 percent.¹⁸¹

Nationally, all pharmacy positions (including manager, clinical coordinator, clinical specialist, entry-level frontline pharmacist, and experienced frontline pharmacist) were perceived as experiencing either moderate or severe shortages. Perceptions of non-management position shortages have trended downward since 2002. Shortages of experienced frontline pharmacists are perceived to be the highest of all pharmacy positions, at more than 50 percent.¹⁸²

¹⁷⁷ *Occupational Outlook Handbook 2004-2005 Edition*, Bureau of Labor Statistics U.S. Department of Labor, <http://www.bls.gov/oco/ocos079.htm>. Accessed November 3rd, 2005.

¹⁷⁸ *Chain Pharmacy Employment Survey*. National Association of Chain Drug Stores, January 2005.

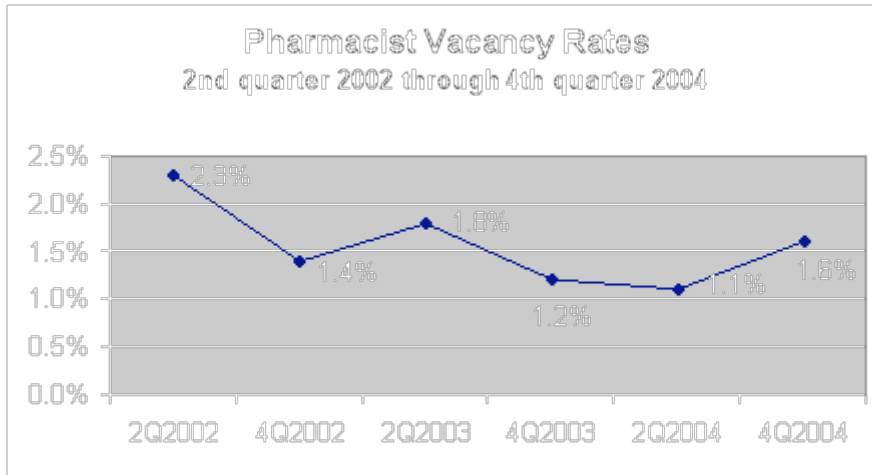
¹⁷⁹ Aggregate Demand Index, <http://www.pharmacymanship.com/>. Accessed November 3rd, 2005.

¹⁸⁰ Knapp KK, Quist RM, Walton SM, Miller LM. *Update on the Pharmacist Shortage: National and State Data Through 2003*. American Journal of Health Systems Pharmacy, 2005; 62:492-499.

¹⁸¹ *2005 ASHP Pharmacy Staffing Survey*, American Society of Health System Pharmacists, 2005.

¹⁸² *2005 ASHP Pharmacy Staffing Survey*, American Society of Health System Pharmacists, 2005

Minnesota Perspective: In 2002, Minnesota was declared the number one state of pharmacist need.¹⁸³ The Minnesota Department of Employment and Economic Development estimates pharmacist vacancy rates ranging from 2.3 percent in 2002 downward to 1.1 percent in 2004.¹⁸⁴



Rural pharmacies in Minnesota have a higher vacancy rate and face greater hiring difficulties than those located in urban areas. Nearly half of all rural pharmacies with vacancies have been trying to fill their positions for more than 10 months, compared to only 30 percent of pharmacies in urban counties.¹⁸⁵

There are a total of 6,179 active pharmacists in Minnesota. Slightly more than half of all total active pharmacists are men (52%). Males tend to share similar numbers of employment in greater Minnesota (1,215) and in the seven-county metro area (1,275). Females, on the other hand, are much more likely to work in the seven-county metro area (1,441) than in greater Minnesota (789).¹⁸⁶ Pharmacists working in rural Minnesota are on average four years older than their urban colleagues.¹⁸⁷

A study conducted of retail pharmacies located in rural Minnesota showed that 56 percent are independently owned, half report two pharmacists on staff and 25.4 percent report having a single pharmacist. This often means reduced service hours in rural pharmacies as compared to urban areas that are able to support larger facilities with extended hours.¹⁸⁸ Between the years 1996-1999, 38 pharmacies in rural Minnesota closed. This resulted in some residents having to drive

¹⁸³ *Journal of the American Pharmacists Association. American Pharmacists Association. 2002*

¹⁸⁴ *Facts and Data on Minnesota Pharmacies, Pharmacists, and Pharmacy Technicians. Minnesota Department of Health Office of Rural Health and Primary Care. 2004.*

¹⁸⁵ *Profile of Pharmacies in Rural Minnesota. Minnesota Department of Health Office of Rural Health and Primary Care. October 2003.*

¹⁸⁶ *Minnesota Board of Pharmacy Statistics. Minnesota Board of Pharmacy. April 2005.*

¹⁸⁷ *Profile of Pharmacies in Rural Minnesota. Minnesota Department of Health Office of Rural Health and Primary Care. October 2003*

¹⁸⁸ *Profile of Pharmacies in Rural Minnesota. Minnesota Department of Health Office of Rural Health and Primary Care. October 2003.*

more than 15 miles to a neighboring community to obtain pharmacy services.¹⁸⁹ The following table shows the trend in pharmacy closures in Minnesota.¹⁹⁰

Table 2 Number of Pharmacy Closures* Minnesota 1996-2002			
Year	Greater Minnesota	7-County Metro Area	Total
1996	13	18	31
1997	15	12	27
1998	17	6	23
1999	13	16	29
2000	16	10	26
2001	11	15	26
2002	17	10	27
Total	102	87	189

*Excludes pharmacies that remained opened after changing ownership.
Source: Minnesota Board of Pharmacy

Factors Influencing Supply and Demand

There are multiple factors influencing the supply and demand of the pharmacist workforce. Following is a brief summary of the major factors.

- *Growth in use of prescription drugs:* Prescription growth rates have been identified as a key factor influencing the pharmacist shortage.¹⁹¹ In 2005, the number of prescriptions dispensed is expected to reach four billion nationally. Between 2001 and 2005, the supply of community pharmacists is expected to increase by only 3.9 percent while the number of prescription drugs dispensed will increase by 26 percent.¹⁹² The Pharmacy Manpower Project reported that with conservative drug order growth estimates over the next twenty years about 100,000 pharmacists would be needed in 2020 for order fulfillment functions. This can be compared to the 135,000 pharmacists currently working in this capacity. The projected need is lower than one may expect despite significant projected increases in medication utilization because of advances in technology and automated filling systems.¹⁹³ The following table presents further information.¹⁹⁴

¹⁸⁹ Casey MM, Klinger J, Moscovice I. *Access to Rural Pharmacy Services In Minnesota, North Dakota, South Dakota*. Working Paper Series, Rural Health Research Center – University of Minnesota, July 2001.

¹⁹⁰ *Profile of Pharmacies in Rural Minnesota*. Minnesota Department of Health Office of Rural Health and Primary Care. October 2003

¹⁹¹ *The Pharmacist Workforce: A Study of the Supply and Demand for Pharmacists*. Health Resources and Services Administration. December 2000.

¹⁹² Pal S. Prescription Sales Surpass \$182 Billion in 2002. *U.S. Pharmacist*, 2003; 28. Posted on 10/15/03.

¹⁹³ *Professionally Determined Need for Pharmacy Services in 2020*. The Pharmacy Manpower Project, Inc. October 2004.

¹⁹⁴ *Professionally Determined Need for Pharmacy Services in 2020*. The Pharmacy Manpower Project, Inc. October 2004.

Table 2-10: Estimated Average Annual Prescriptions per Retail Pharmacist*

Year	Retail Pharmacists	Number of Pharmacists x (millions)	Prescriptions Per Pharmacist	Annual Prescription Increase	Cummulative Rx/ RPh Increase
1992	111,373	1,942	17,438		
1993	112,854	2,033	18,017	3.3%	3.3%
1994	115,213	2,172	18,850	4.6%	8.1%
1995	117,948	2,203	18,676	-0.9%	7.1%
1996	119,352	2,298	19,251	3.1%	10.4%
1997	117,929	2,394	20,298	5.4%	16.4%
1998	120,413	2,565	21,300	4.9%	22.1%
1999	122,146	2,799	22,914	7.6%	31.4%

*Data were extracted from Tables 2-3 and 2-7.

- Expansion of pharmacist's role in healthcare settings:* A fundamental shift has been occurring in the role of pharmacists in the healthcare delivery system. The profession has expanded beyond medication dispensing to an increased number of clinical functions, including monitoring compliance, reviewing drug therapy, recommending changes in drug regimens, and educating patients on behavior modification.¹⁹⁵ In simple terms, pharmacists are now more “patient-centered” and less “product-centered.” These new activities for pharmacists are often part of collaborative practice agreements with physicians and other health care delivery systems. Professional, technical, and market forces are driving this evolution.¹⁹⁶ For example, this shift can be partially attributed to the change in degree requirements from M.S. to a doctor of pharmacy degree (PharmD).¹⁹⁷ A growing body of knowledge indicates that patients experience improvements in health outcomes and reductions in health care costs when a pharmacist is involved in managing the patients' care.¹⁹⁸
- Increase in number of female pharmacists in the workplace:* In 2000, the number of licensed practicing female pharmacists was more than 40 percent.¹⁹⁹ In addition to representing nearly half of working pharmacists, female pharmacists report working fewer hours than their male colleagues and are more likely to work part time.²⁰⁰ The American Association of Colleges of Pharmacy has indicated that women have

¹⁹⁵ *Pharmacists – Position Paper*. American Academy of Family Physicians Policy and Advocacy. November 2005. <http://www.aafp.org/x16625.xml>

¹⁹⁶ Poole, VH, Moran, DW, Webb CE. *Estimating the Cost of the Medicare Pharmacist Services Coverage Act of 2001*. *Pharmacotherapy*, 2003; 23: 955-965.

¹⁹⁷ Cooksey JA, Knapp KK, Walton SM, Cultice JM. *Challenges to the Pharmacist Profession for Escalating Pharmaceutical Demand*. *Health Affairs*, 2002; 21: 182-188.

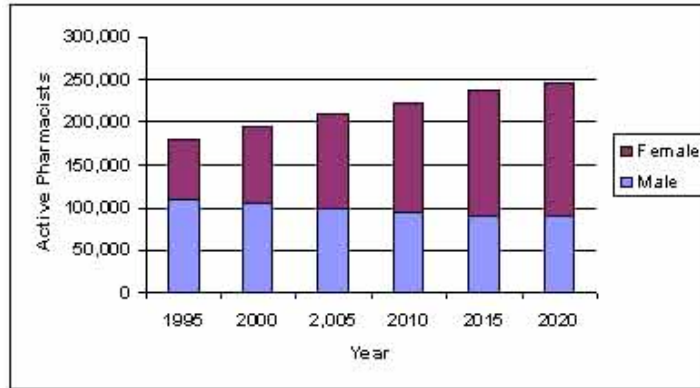
¹⁹⁸ Knapp KK, Quist RM, Walton SM, Miller LM. *Update on the Pharmacist Shortage: National and State Data Through 2003*. *American Journal of Health Systems Pharmacy*, 2005; 62: 492-499.

¹⁹⁹ *National Pharmacist Workforce Survey: 2000*. The Midwest Pharmacy Workforce Research Consortium. August 2000.

²⁰⁰ Walton SM, Cooksey JA. *Differences Between Male and Female Pharmacists in Part-Time Status and Employment Settings*. *Journal of the American Pharmaceutical Association*, 2001; 41: 703-708.

represented the majority of applicants since 1982.²⁰¹ In 2004, 66.5 percent of the applicants to Colleges of Pharmacy were female.²⁰²

Figure 1. Pharmacists by gender nationally: projected 1995-2020.²⁰³



- *Increase in the number of retail pharmacy outlets:* The following table depicts the growth in community pharmacies during the 1990s.²⁰⁴

Table 2-1: Community Pharmacies: Number of Stores, and Number of Prescriptions (in millions), 1990-1999

Year	Chain		Independent		Mass Merchant		Supermarket		Mail Order		Total Stores	
	Stores	RXs	Stores	RXs	Stores	RXs	Stores	RXs	Stores	RXs	Stores	RXs
1990	18,638		31,879		3,484		4,641				58,642	
1991	18,607		30,503		3,589		4,796				57,495	
1992	17,806	730	27,305	795	3,994	186	4,948	173	NA**	188	54,053	2,072
1993	18,039	780	26,227	780	4,331	195	5,424	175	NA	212	54,021	2,142
1994	18,103	815	24,862	770	4,559	225	5,719	200	NA	236	53,243	2,246
1995	18,165	900	23,112	732	4,851	254	6,027	228	NA	258	52,155	2,372
1996	18,523	937	22,006	692	4,693	252	6,155	242	NA	295	51,377	2,418
1997	19,119	999	20,844	685	4,914	254	6,293	269	NA	328	51,170	2,535
1998	19,108	1,087	20,641	693	5,254	272	6,963	306	NA	368	51,966	2,726

*Data from NACDS publication, Industry Profile, 2000.

**NA= not applicable

As indicated earlier, about 62 percent of licensed pharmacists are employed in retail pharmacies.²⁰⁵ This trend has been consistent during the last 15 years.²⁰⁶

²⁰¹ *Pharmacy Education Where Are We? Where Are We Going?* American Association of Colleges of Pharmacy, December 2004.

²⁰² American Association of Colleges of Pharmacy

<http://www.aacp.org/site/page.asp?VID=1&CID=1029&DID=6072&TrackID=>. Accessed November 3, 2005.

²⁰³ Gershon SK, Cultice JH, Kanpp KK. *How Many Pharmacists Are in Our Future? The Bureau of Health Professions Projects Supply to 2020.* Journal of the American Pharmaceutical Association, 2000; 40: 757-764.

²⁰⁴ *The Pharmacist Workforce: A Study of the Supply and Demand for Pharmacists.* Health Resources and Services Administration. December 2000.

²⁰⁵ *Occupational Outlook Handbook 2004-2005 Edition*, Bureau of Labor Statistics U.S. Department of Labor, <http://www.bls.gov/oco/ocos079.htm>. Accessed November 3rd, 2005.

However, these numbers do not equate with the increased demand for pharmacy services during the same time period. As more independent pharmacies close, the chain drug store market has increased. Expansion of services, extended hours of operation and continual growth in new stores has led to rising demand for pharmacists. The following table shows the changes in pharmacy type and number of pharmacists employed in different sectors over time.²⁰⁷

Pharmacists' Employment By Industry, Retail Pharmacy Stores, And Pharmacists' Income, Selected Years 1990-2000

	1990	1992	1994	1996	1998	2000
Pharmacist jobs in all industries, total	167,450	162,673	167,458	171,689	184,368	216,865 ^a
Self-employed pharmacists	9.0%	6.2%	4.2%	4.7%	3.4%	2.8% ^a
Retail and community pharmacies	60.2	57.8	58.8	58.5	57.9	62.7
Health services ^b	26.5	30.8	30.3	29.9	29.1	24.5
Other ^c	4.2	5.2	6.7	6.9	9.6	10.0
Retail pharmacies/drug stores, total	58,642	54,043	53,243	51,377	51,966	55,011
Chain drug stores	18,638	17,806	18,103	18,523	19,108	20,298
Independent drug stores	31,879	27,305	24,862	22,006	20,641	20,896
Food stores	4,641	4,948	5,719	6,155	6,963	8,268
Mass merchants	3,484	3,994	4,559	4,693	5,254	5,549
Annual income ^d						
Chain drug store pharmacist	-	\$54,300	\$59,200	\$65,500	\$68,600	\$81,900
Hospital pharmacist	-	51,500	55,300	62,000	62,500	79,100

SOURCES: Bureau of Labor Statistics (BLS); National Association of Chain Drug Stores; and C. Ukens, "Up, Up, and Away," *Drug Topics* (19 March 2001): 25-35.

^aBLS survey process and definitions changed between 1998 and 2000.

^bIncludes hospitals, long-term care facilities, and home health.

^cIncludes business, insurance, wholesale trade, government, education, and other.

^dIncludes salaries, bonuses, and overtime.

- *Inefficiencies in the workplace:* Inefficient use of pharmacist time has been clearly linked to pharmacy workforce issues. Twenty percent of a community pharmacist's time is spent on third-party-related administrative tasks that could be handled by others.²⁰⁸ Some experts argue the model used for filling prescriptions in the United States could be handled by other types of personnel, including technical workers and/or technology. However, the pharmacy profession has failed to consistently implement these options.
 - *Technical Workers:* Approximately 190,000 pharmacy technicians were certified by the Pharmacy Technician Certification Board (PTCB) from 1995-2004.²⁰⁹ While many in the profession believe this is an important step in developing support staff to assist pharmacists with routine tasks, there are areas of concern, including a lack of universal education and training standards for technician staff and limited educational training requirements (high school degree or equivalency and completion of PTCB). Many believe implementation of standards surrounding education and training of technicians would benefit the entire workforce.²¹⁰

²⁰⁶ *The Pharmacist Workforce: A Study of the Supply and Demand for Pharmacists.* Health Resources and Services Administration. December 2000.

²⁰⁷ Cooksey JA, Knapp KK, Walton SM, Cultice JM. *Challenges to the Pharmacist Profession for Escalating Pharmaceutical Demand.* *Health Affairs*, 2002; 21: 182-188.

²⁰⁸ *Professionally Determined Need for Pharmacy Services in 2020.* The Pharmacy Manpower Project, Inc. October 2004.

²⁰⁹ Zellmer WA. *Unresolved issues in pharmacy.* *American Journal of Health-System Pharmacy*, 2005; 62:259-65.

²¹⁰ Zellmer WA. *Unresolved issues in pharmacy.* *American Journal of Health-System Pharmacy*, 2005; 62:259-65.

- *Technology*: The industry as a whole has not implemented standardized technology, leading to additional inefficiencies in the workplace. An estimated 40 percent of new prescriptions require clarifying calls before data entry. Ten percent of these calls are made to verify health plan eligibility and twenty percent require calls about coverage issues.²¹¹ System automation could increase productivity and reduce errors in the dispensing system.²¹² Electronic ordering, centralized dispensing facilities, and pharmacy smart cards are a few of the concepts being tested that could influence how technology could increase pharmacist efficiency.

Expansion of Pharmacy Educational Offerings

According to the American Association of Colleges of Pharmacy, there has been a steady increase in the number of schools of pharmacy opening or expanding in recent years. The full extent of the impact of these additional program offerings is still unknown.

Expansion of Pharmacy Educational Offerings²¹³

	Total number of accredited programs	Number of PharmD degrees conferred	Total degree enrollment	Percentage of male/female students enrolled	Percent of minority enrollment
2006	89	N/A*	N/A	N/A	N/A
2005	89	N/A	N/A	N/A	N/A
2004	89	7770	43,908	66.5/33.5	12.95
2003	87	6649	43,047	66.9/33.1	13.89
2002	85	6158	38,902	67.0/33.0	14.04
2001	83	5086	35,885	65.9/34.1	13.68
2000	82	4304	34,481	65.9/34.1	13.12

*Data will not be available until March 2006.

The University of Minnesota College of Pharmacy expanded its educational program to the Duluth campus in 2003, increasing the number of Minnesota pharmacy graduates from an average of 100 per year to 150 beginning Spring 2008. The Duluth College of Pharmacy program has a specific mission to address rural pharmacy shortages and places significant emphasis on rural experiential learning.

Medicare Part D

January 1st, 2006, brought forth the inception of Medicare Part D. This is the prescription drug coverage plan provided by Medicare as outlined in the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (MMA). Under this new plan and as of January

²¹¹ *Professionally Determined Need for Pharmacy Services in 2020*. The Pharmacy Manpower Project, Inc. October 2004.

²¹² *Implementing Effective Change in Meeting the Demands of Community Pharmacy Practice in the United States*. National Association of Chain Drug Stores, August 1999.

²¹³ American Association of Colleges of Pharmacy <http://www.aacp.org/site/page.asp?VID=1&CID=1029&DID=6072&TrackID=>. Accessed November 3, 2005.

1st, there are currently 21 million seniors and people with disabilities already enrolled in the program that will receive prescription drug coverage.²¹⁴

As indicated earlier, the growth in prescription drug use in the United States is unprecedented and the impact on pharmacist workload cannot be overlooked. The number of prescriptions filled by U.S. pharmacies in the last decade has increased dramatically from 2 billion to 3.2 billion.²¹⁵ This trend is expected to continue as a consequence of the “graying of America”; as there are an estimated 43 million beneficiaries now eligible for prescription drug coverage under Medicare in 2006.²¹⁶

In addition to expected growth in number of prescriptions filled, the MMA will also impact the daily work activities of pharmacists. Medicare Part D requires plans to pay for medication therapy management (MTM) services for targeted beneficiaries. Pharmacists have been identified as a primary provider of MTM services. According to a report on MTM prepared by the Lewin Group, MTM activities provided by pharmacists include such things as: medication therapy management/polypharmacy, disease management, lab testing/screening, wellness programs/immunizations.²¹⁷

Policy changes implemented by the government, such as the Medicare drug benefit, can greatly influence the pharmacist workforce. For example, the Professionally Determined Need for Pharmacy Services indicated that as the Medicare drug benefit is implemented, there would be an increased demand for pharmacists in the federal government. They predict that in 2020, there will be 4000 pharmacists needed for regulatory/government policy roles, up from 2000 pharmacists in 2001.²¹⁸

²¹⁴ *Pharmacist Shortage Could Threaten the U.S. Healthcare System*. Newsinferno News Staff. Accessed January 4, 2006, from <http://www.newsinferno.com/storypages/11-08-2005-005.html>.

²¹⁵ *Pharmacist Shortage Could Threaten the U.S. Healthcare System*. Newsinferno News Staff. Accessed January 4, 2006, from <http://www.newsinferno.com/storypages/11-08-2005-005.html>.

²¹⁶ *The Medicare Prescription Drug Benefit*. The Henry J. Kaiser Family Foundation. Accessed January 4, 2006, from <http://www.kff.org/medicare/upload/7044-02.pdf>.

²¹⁷ *Medication Therapy Management Services: A Critical Review*. Prepared for the American Pharmacist Association by The Lewin Group. May 17, 2005.

²¹⁸ *Professionally Determined Need for Pharmacy Services in 2020*. The Pharmacy Manpower Project, Inc. October 2004.

Appendix D: Workforce Trends

D.2. Six Health Professions Overview(continued)

A National and State Perspective on the Public Health Workforce

Executive Summary

Trends with Implications for Enrollment Decisions

National

- While the public health workforce is central to the performance of health systems and to achieving improvements in overall population health, very little is known about its composition, training or performance. The workforce includes: physicians, nurses, health managers, occupational health and safety personnel, health economists, environmental health specialists, health promotion specialists and community development workers.²¹⁹
- The nation is served by more than 3,000 county and city health departments, more than 3,000 local boards of health, 59 state and territorial health departments, tribal health departments, more than 180,000 public and private laboratories, and several federal health and environmental agencies.²²⁰
- At the current best estimate, the public health workforce is composed of 448,254 persons in salaried positions. Of this workforce, 3.6% work in official/administrative positions, 44.6% in professional positions, 13.9% in technical positions, and 12.9% in clerical/support positions. The remaining 25% could not be assigned to a specific category.²²¹
- Of the 448,254 national public health employees identified in 2000, 11% were nurses.²²²
- The public health workforce is 34 percent local, 33 percent state, 19 percent federal; and 14 percent of the workforce is located in other settings.²²³
- The average age of public health workers is about 47 years.²²⁴
- The ratio of public health workers to population has declined through the 20th century.²²⁵ Over the 30-year period beginning in 1970 and ending in 2000, the ratio of public health workers to U.S. residents fell from 1:457 to 1:635.²²⁶
- Global factors that affect the public health workforce include: increased chance of disease transmission due to greater movement of goods and people, antimicrobial resistance

²¹⁹ Beaglehole, R, Dal Poz, MR. *Public health workforce: challenges and policy issues*. Human Resources for Health, 2003: 1;4. Accessed February 1, 2006 from <http://www.human-resources-health.com/content/1/1/4>.

²²⁰ *Public Health's Infrastructure – A Status Report*. Centers for Disease Control and Prevention, 2000.

²²¹ *The Public Health Workforce Enumeration 2000*. Bureau of Health Professions U.S. Department of Health and Human Services, December 2000.

²²² Mahan, CM, Malecki, JM. *Confronting the Impending Public Health Workforce Crises in America: Perspectives from Academia and Public Health Practice*. Florida Public Health Review, 2004: 1; 4-7.

²²³ *The Public Health Workforce Enumeration 2000*. Bureau of Health Professions U.S. Department of Health and Human Services, December 2000.

²²⁴ *State Public Health Employee Worker Shortage Report: A Civil Service Recruitment and Retention Crises*. Association of State and Territorial Health Officials, 2004.

²²⁵ Tilson, H., Gebbie, K.M. *The Public Health Workforce*. Annual Review of Public Health, 2004: 25;341-56.

²²⁶ Baker, E.L., Potter, M.A., Jones, D.L., Mercer, S.L., Cioffi, J.P., Green, L.W., Halverson, P.K., Lichtveld, M.Y., Fleming D.W. *The Public Health Infrastructure and Our Nation's Health*. Annual Review of Public Health, 2005;26:303-318.

- coupled with microbial evolution, public health infrastructure gaps (vaccine shortages, poor detection and reporting methods, clean water shortages, poverty, etc.), environmental and ecologic changes, population growth, and bioterrorism.²²⁷
- Only 20 percent of the nation's estimated 448,254 public health professionals have the education and training needed to do their jobs most effectively.²²⁸
 - Factors influencing supply and demand: budget cuts, complexity of the workforce, changing demographics of United States population, access to educational training, worker distribution, challenges of rural areas.

Minnesota

- Minnesota's public health workforce involves approximately 4,700 people.²²⁹
- Three fourths of Minnesota's workers are reported to be at the local level.²³⁰ The Local Public Health Agency Survey estimates the local public health workforce at approximately 3,372 staff.²³¹
- The average age of local public health workers in Minnesota is 46.2 years old.²³²
- In Minnesota, 75 percent of the health departments reduced or eliminated positions during 2003.²³³ Additionally in 2004, 72 percent of health departments in Minnesota reported eliminating services/programs and 80 percent reported reducing services/programs.²³⁴
- In Minnesota, it is estimated that 21 percent of the current local public health workforce will retire within the next ten years.²³⁵

University of Minnesota School of Public Health Facts and Figures

- There has been a steady number of applications to all the public health programs offered at the University of Minnesota. No sharp increase or decrease is noted.
- The top three public health programs available at the University are epidemiology, environmental health, and healthcare administration, and as evidenced by the numbers of applicants, matriculates (270, 206, and 189 respectively), and graduates for the past five years.
- The majority of students in the programs are white (67%-100%); however, there seems to be more minorities and foreign individuals in the MS and PhD programs.
- There are few public health programs that are evenly distributed by male and female students like healthcare administration, clinical research, and health services research, policy, and administration but consist of predominantly female individuals. For example,

²²⁷ *Public Health's Infrastructure – A Status Report*. Centers for Disease Control and Prevention, 2000.

²²⁸ *Public Health*. Bureau of Health Professions U.S. Department of Health and Human Services. Accessed February 1, 2006 from <http://bhpr.hrsa.gov/publichealth/index.htm>.

²²⁹ *The Public Health Workforce Enumeration 2000*. Bureau of Health Professions U.S. Department of Health and Human Services, December 2000.

²³⁰ *The Public Health Workforce Enumeration 2000*. Bureau of Health Professions U.S. Department of Health and Human Services, December 2000.

²³¹ *Results from the 2004 Local Public Health Agency Survey*. Minnesota Department of Health, November, 2004.

²³² *Results from the 2004 Local Public Health Staff Survey*. Minnesota Department of Health, September 2005.

²³³ *Results from the 2004 Local Public Health Agency Survey*. Minnesota Department of Health, November, 2004.

²³⁴ *Results from the 2004 Local Public Health Agency Survey*. Minnesota Department of Health, November, 2004.

²³⁵ *Results from the 2004 Local Public Health Staff Survey*. Minnesota Department of Health, September 2005.

- programs such as community health, maternal and child education, and public health nutrition average enrollment of 90% females.
- A range of 21% - 44% graduates of the Masters of Healthcare Administration program practice in the state of Minnesota upon graduation, whereas the information in other programs is unavailable.

Researched and compiled by: Kaia Sjogen, Masters of Public Health candidate, School of Public Health and Christine Bartels, PhD Candidate, Social and Administrative Pharmacy Graduate Program; graduate research assistants, Academic Health Center Office of Education

Appendix D: Workforce Trends

D.2. Six Health Professions Overview(continued)

A National and State Perspective on the Veterinary Medicine Workforce

Executive Summary Trends with Implications for Enrollment Decisions

National

- The average age of actively employed veterinarians in the United States is 45 years (49 for men; 40 for women). Among current practicing veterinarians, approximately 45 percent are women and 55 percent are male. By 2005-2006, the number of practicing women veterinarians in the profession is expected to outnumber men.²³⁶
- Trends that have an impact on the profession: Veterinary Workforce Expansion Act: Employment Distribution of Veterinarians, veterinary school graduates, increasing role in public health.
- Urbanization and affluence have increased demand for companion animal care; where as consolidation in livestock production has limited demand for veterinarians in those arenas.²³⁷ In 2001, the percentages of households owning companion animals are as follows: 36 percent with dogs, 32 percent with cats, 5 percent with birds and 2 percent with horses.²³⁸ It is important to note that there has been a slight downturn in these percentages in recent years, reflecting a shift from ownership of dogs and cats to less traditional or exotic pets nationally.²³⁹ More pet owners are purchasing pet insurance, increasing the likelihood that a considerable amount of money will be spent on veterinary care for their pets.²⁴⁰ As more and more of these exotic pets are viewed as members of the family, people are more likely to require high levels of specialized veterinary care.
- In 2004, 73.4 percent of students enrolled in veterinary schools nationwide were women.²⁴¹ It is estimated that the female proportion of veterinarians will be 67% by the year 2015.²⁴² This is important for overall workforce trends as women are already working 3 to 4 hours per

²³⁶ *Veterinary Medical Education and the University of California*. Accessed February 22, 2006, from <http://www.ucop.edu/healthaffairs/REFORMATTED%20VETERINARY%20MEDICINE.pdf>.

²³⁷ Brown, J.P., Silverman, J.D. KPMG LLP Economic Consulting Service. *The Current and Future Market for Veterinarians and Veterinary Medical Services in the United States*. Journal of the American Veterinary Medical Association, 1999; 215: 161-183.

²³⁸ *Veterinary Market Statistics, Companion Animals*. Accessed February 20, 2006 from http://www.avma.org/membshp/marketstats/comp_exotic.asp

²³⁹ Brown, J.P., Silverman, J.D. KPMG LLP Economic Consulting Service. *The Current and Future Market for Veterinarians and Veterinary Medical Services in the United States*. Journal of the American Veterinary Medical Association, 1999; 215: 161-183.

²⁴⁰ *Occupational Outlook Handbook 2004-2005 Edition*, Bureau of Labor Statistics U.S. Department of Labor. Accessed February 22, 2006, from <http://www.bls.gov/oco/ocos076.htm>.

²⁴¹ *Veterinary Market Statistics*. Association of American Veterinary Medical Colleges. Accessed February 22, 2006 from <http://www.avma.org/membshp/marketstats/usvetedu.asp>.

²⁴² Brown, J.P., Silverman, J.D. KPMG LLP Economic Consulting Service. *The Current and Future Market for Veterinarians and Veterinary Medical Services in the United States*. Journal of the American Veterinary Medical Association, 1999; 215: 161-183.

week less than males. In the future, the growing proportion of women will be providing fewer work hours than men traditionally have.²⁴³

- Veterinarians' debt problem as not purely a debt problem but as an income problem. The consequence to the veterinarian profession of this problem is that graduates' ability to repay student loans is lessened and they are limited to invest in personal and professional growth. Additionally, there is a failure to attract the best and brightest to the professions.²⁴⁴
- The world's population is expected to be 10 billion by 2050. This growth will result in encroachment on animal habitat, leading to increased human interaction with wild and exotic animals. Additionally, intensified food production, globalization of the food market, changing climates and ecosystems, deforestation, dam building and irrigation have increased human contact with vectors of diseases.²⁴⁵ These exchanges of both humans and animals and animal products are contributing to increasing rates of global disease transmission.

Minnesota

- The Minnesota Board of Veterinary Medicine reported 2,229 active licenses in Minnesota and 701 inactive licenses in 2006.²⁴⁶
- The University of Minnesota College of Veterinary is well positioned to continue to take an international leadership role in public health. XXX students per year are currently pursuing a MPH degree

University of Minnesota College of Veterinary Medicine Facts and Figures

- XX % of practicing veterinarians in Minnesota are graduates of the University of Minnesota
- Trends in enrollments since 1980 – attempted to close the school in 199X
- From 2000 to 2005, 460 veterinarians graduated from the CVM.
- Since 2000, an average of 66.3%, or 305 of the CVM class has been Minnesota residents.
- From 2000 to 2005, an average of 52.7%, or 242 U of MN College of Veterinary Medicine graduates established practices in Minnesota. ? distribution
- In 2005 the number of applicants to the College of Veterinary Medicine has decreased by 16% when compared to 2000. It is the only AHC school with a decline in applications. The number of qualified applicants is the essentially same as in 2000. The number of accepted students has risen from 80 to 90 between 2000 and 2005.
- Of the 460 students who matriculated between 2000 and 2005, 102 (22%) were/are male; 78%, or 359, female. Of note, the percentage of male matriculants increased in 2005 **Check minority figures. 2003 appears incorrect.**

²⁴³ Brown, J.P., Silverman, J.D. KPMG LLP Economic Consulting Service. *The Current and Future Market for Veterinarians and Veterinary Medical Services in the United States*. Journal of the American Veterinary Medical Association, 1999; 215: 161-183.

²⁴⁴ Brown, J.P., Silverman, J.D. KPMG LLP Economic Consulting Service. *The Current and Future Market for Veterinarians and Veterinary Medical Services in the United States*. Journal of the American Veterinary Medical Association, 1999; 215: 161-183.

²⁴⁵ *Veterinary Medical Education and Workforce Development Act*. Accessed February 26, 2006 from <http://aavmc.org/documents/VMEWDA.pdf>

²⁴⁶ Personal conversation with staff at Minnesota Board of Veterinary Medicine, February 22, 2006.

- Tuition and fees have increased XX% between 2000 and 2005.
- The average CVM graduate debt load was \$100,187.

National Veterinarian Workforce Summary

According to the American Veterinary Medical Association in 2005, there were a total of 79,569 veterinarians in the United States, 68 percent of which were employed in private clinical practice, 16 percent in the public or corporate sector, and 16 percent in other.²⁴⁷ The Federal Government employs about 1,200 civilian veterinarians, mostly working in the U.S. Departments of Agriculture, Health and Human Services, and, Homeland Security.²⁴⁸

The national average for veterinarian to population ratio is 27 veterinarians per 100,000 population.²⁴⁹ Veterinarians held about 61,000 jobs in 2004. About 1 out of 5 veterinarians was self-employed in a solo or group practice.²⁵⁰ In 2003, 11 percent of the practicing veterinarians identified themselves as specialists.²⁵¹ See the following table for more information about job distribution.²⁵²

By Primary Employer Codes (as of October 2004)

College/University	4,195
Government	1,403
Non-governmental Organization	140
Association	72
Humane Organization	197
Multinational/International	31
Missionary, Volunteer, Development Organization	19
Uniformed Services	486
Self-Employed	3,076
Self-Employed: Practice Owner	22,981
Self-Employed: Consultant	375
Private Clinical Practice Employee	23,025
Industry	1,667
Non-Veterinary Employment	57
Not-Employed	177
Not-Listed Above	873
Employer Unknown	12,342
Total	71,116

²⁴⁷ *Veterinary Market Statistics*. American Veterinary Medical Association. Accessed February 21, 2006, from <http://www.avma.org/membshp/marketstats/usvet.asp#usveterinaryprac>.

²⁴⁸ *Occupational Outlook Handbook 2004-2005 Edition*, Bureau of Labor Statistics U.S. Department of Labor. Accessed February 22, 2006, from <http://www.bls.gov/oco/ocos076.htm>.

²⁴⁹ *Veterinary Medical Education and the University of California*. Accessed February 22, 2006, from <http://www.ucop.edu/healthaffairs/REFORMATTED%20VETERINARY%20MEDICINE.pdf>.

²⁵⁰ *Occupational Outlook Handbook 2004-2005 Edition*, Bureau of Labor Statistics U.S. Department of Labor. Accessed February 22, 2006, from <http://www.bls.gov/oco/ocos076.htm>.

²⁵¹ *Veterinary Medical Education and the University of California*. Accessed February 22, 2006, from <http://www.ucop.edu/healthaffairs/REFORMATTED%20VETERINARY%20MEDICINE.pdf>.

²⁵² *Veterinary Market Statistics*. Association of American Veterinary Medical Colleges. Accessed February 22, 2006 from <http://www.avma.org/membshp/marketstats/usvetedu.asp>.

The average age of actively employed veterinarians in the United States is 45 years (49 for men; 40 for women). Among current practicing veterinarians, approximately 45 percent are women and 55 percent are male. By 2005-2006, the number of practicing women veterinarians in the profession is expected to outnumber men.²⁵³

The Bureau of Labor Statistics expects there to be 28,000 job openings in the veterinary medical profession due to growth and net replacements by the year 2012, a turnover of nearly 38 percent.²⁵⁴

The USDA, or the largest employer in the federal government, predicts a shortage of 584 Veterinary Medical Officers by 2007.²⁵⁵ There is also a shortage of veterinarians at the state level. State agencies have trouble filling existing vacancies, and are facing serious budget shortfalls leading to strict hiring freezes and making them unlikely to create and fill new positions.²⁵⁶

Minnesota Veterinarian Workforce Summary

The Minnesota Board of Veterinary Medicine reported 2,229 active licenses in Minnesota and 701 inactive licenses in 2006²⁵⁷.

Factors Influencing Supply and Demand

- *Veterinary Workforce Expansion Act*: In 2005, it was recognized by members of the government that the nation's veterinary medical colleges did not have the capacity to satisfy the current and future demand for veterinarians. Additionally, they reported veterinary expertise is vital to maintaining public health preparedness.²⁵⁸ Because most of the biological agents that pose the highest risk to national security are transmitted from animals to humans, veterinarians were identified as an essential part of the nation's public health system. As a profession, they have special expertise in diagnosis, prevention, and controlling these types of diseases.²⁵⁹

²⁵³ *Veterinary Medical Education and the University of California*. Accessed February 22, 2006, from <http://www.ucop.edu/healthaffairs/REFORMATTED%20VETERINARY%20MEDICINE.pdf>.

²⁵⁴ *Veterinary Medical Education and Workforce Development Act*. Accessed February 26, 2006 from <http://aavmc.org/documents/VMEWDA.pdf>

²⁵⁵ *Emergency Needs in American Veterinary Human Resources*. Association of American Veterinary Medical Colleges, April, 2003.

²⁵⁶ *Emergency Needs in American Veterinary Human Resources*. Association of American Veterinary Medical Colleges, April, 2003.

²⁵⁷ Personal conversation with staff at Minnesota Board of Veterinary Medicine, February 22, 2006.

²⁵⁸ *Veterinary Workforce Expansion Act*. Association of American Veterinary Medical Colleges, March, 2003. Accessed February 23, 2006 from <http://aavmc.org/documents/VWEA15MAR05e.pdf>.

²⁵⁹ *Veterinary Workforce Expansion Act*. Association of American Veterinary Medical Colleges, March, 2003. Accessed February 23, 2006 from <http://aavmc.org/documents/VWEA15MAR05e.pdf>.

The Veterinary Workforce Expansion Act (Senate Bill 914) has been introduced to resolve the critical shortages of veterinarians. This bill will allow veterinary medical colleges to expand their training programs for veterinary public health professionals by building infrastructure, research laboratories, and classroom space, to provide training for veterinary students in public health, food safety, infectious diseases, global health and environmental quality.²⁶⁰

- *Employment Distribution of Veterinarians:* Societal changes in the last half century have led to shifts in veterinary practice. Urbanization and affluence have increased demand for companion animal care; where as consolidation in livestock production has limited demand for veterinarians in those arenas.²⁶¹ In 2001, the percentages of households owning companion animals are as follows: 36 percent with dogs, 32 percent with cats, 5 percent with birds and 2 percent with horses.²⁶² It is important to note that there has been a slight downturn in these percentages in recent years, reflecting a shift from ownership of dogs and cats to less traditional or exotic pets nationally.²⁶³ More pet owners are purchasing pet insurance, increasing the likelihood that a considerable amount of money will be spent on veterinary care for their pets.²⁶⁴ As more and more of these exotic pets are viewed as members of the family, people are more likely to require high levels of specialized veterinary care.

Public health needs, food safety and security, animal health, and comparative medicine, have received greater national and international attention than ever before.²⁶⁵ These needs have increased the demand for veterinarians with expertise in population health and public health practice. The public practice veterinary corps plays a crucial role in protecting animal and human health. Veterinarians engaged in public practice are involved in public health, food safety, food security, infectious diseases, global health, laboratory animal medicine, drug and vaccine safety, and environmental quality.²⁶⁶ Currently, approximately 5,000 veterinarians work in public practice. Of these, nearly 2,500 work in federal government agencies, approximately 700 work in state government, 1,600 work in industry, and approximately 250 work in academia and extension.²⁶⁷ The nation is facing serious shortages in all areas of veterinary public

²⁶⁰ Allard, W. *Public Health Needs More Veterinarians*. Accessed February 23, 2006, from <http://www.coloradoan.com/apps/pbcs.dll/article?AID=/20060124/OPINION04/601240307/1014>.

²⁶¹ Brown, J.P., Silverman, J.D. KPMG LLP Economic Consulting Service. *The Current and Future Market for Veterinarians and Veterinary Medical Services in the United States*. Journal of the American Veterinary Medical Association, 1999; 215: 161-183.

²⁶² *Veterinary Market Statistics, Companion Animals*. Accessed February 20, 2006 from http://www.avma.org/membshp/marketstats/comp_exotic.asp

²⁶³ Brown, J.P., Silverman, J.D. KPMG LLP Economic Consulting Service. *The Current and Future Market for Veterinarians and Veterinary Medical Services in the United States*. Journal of the American Veterinary Medical Association, 1999; 215: 161-183.

²⁶⁴ *Occupational Outlook Handbook 2004-2005 Edition*, Bureau of Labor Statistics U.S. Department of Labor. Accessed February 22, 2006, from <http://www.bls.gov/oco/ocos076.htm>.

²⁶⁵ Hoblet, K.H., Maccabe, A.T., Heider, L.E. *Veterinarians in Population Health and Public Practice: Meeting Critical National Needs*. Journal of Veterinary Medical Education, 2002; 30: 232-239.

²⁶⁶ *Veterinary Workforce Expansion Act*. Association of American Veterinary Medical Colleges, March, 2003. Accessed February 23, 2006 from <http://aavmc.org/documents/VWEA15MAR05e.pdf>.

²⁶⁷ *Emergency Needs in American Veterinary Human Resources*. Association of American Veterinary Medical Colleges, April, 2003.

practice because the educational capacity in veterinary medical education has not changed in 20 years. The 2,500 veterinarians produced by the 28 veterinary colleges in the United States each year are insufficient to meet societal needs.²⁶⁸ To satisfy current needs, it is projected that more than 500 of the 2,500 available US graduates each year need to enter public health practice. If these positions are not filled by US graduates, the industries (government, non-governmental organizations, industry, and agribusiness) will look to either foreign-trained veterinarians or non-veterinarians to fill their needs.²⁶⁹ Continued support for public health and food safety, national disease control programs, homeland security, and biomedical research on human health problems will contribute to growing demand for veterinarians.²⁷⁰

- *Graduates of Veterinary Schools:* As stated earlier, approximately 2,400 students graduate each year from the 28 accredited colleges and schools of veterinary medicine in the United States.²⁷¹ Current enrollment of underrepresented minorities was at 9.7 percent in 2005 nationally, or in other words 90 percent of students enrolled in veterinary schools were white.^{272, 273} Enrollment data from 2005 also showed the first downturn in the percentage of all minority students for the first time since 1988. Therefore, the lack of diversity in veterinary medical colleges is much more acute than in other health professions.²⁷⁴ In 2004, 73.4 percent of students enrolled in veterinary schools nationwide were women.²⁷⁵ It is estimated that the female proportion of veterinarians will be 67% by the year 2015.²⁷⁶ This is important for overall workforce trends as women are already working 3 to 4 hours per week less than males. In the future, the growing proportion of women will be providing fewer work hours than men traditionally have.²⁷⁷
- *Veterinarian Income:* Like other health professions, increases in student debt are significant issues facing many recent veterinary graduates. Many feel however that veterinary students have been particularly susceptible to these increases as veterinary schools and colleges are trying to offset state budget cuts. See the following graph.²⁷⁸

²⁶⁸ *Veterinary Workforce Expansion Act.* Association of American Veterinary Medical Colleges, March, 2003. Accessed February 23, 2006 from <http://aavmc.org/documents/VWEA15MAR05e.pdf>.

²⁶⁹ Hoblet, K.H., Maccabe, A.T., Heider, L.E. *Veterinarians in Population Health and Public Practice: Meeting Critical National Needs.* Journal of Veterinary Medical Education, 2002; 30: 232-239.

²⁷⁰ *Occupational Outlook Handbook 2004-2005 Edition,* Bureau of Labor Statistics U.S. Department of Labor. Accessed February 22, 2006, from <http://www.bls.gov/oco/ocos076.htm>.

²⁷¹ Hoblet, K.H., Maccabe, A.T., Heider, L.E. *Veterinarians in Population Health and Public Practice: Meeting Critical National Needs.* Journal of Veterinary Medical Education, 2002; 30: 232-239.

²⁷² *Diversity Matters.* Association of American Veterinary Medical Colleges, 2005.

²⁷³ *Veterinary Medical Education and the University of California.* Accessed February 22, 2006, from <http://www.ucop.edu/healthaffairs/REFORMATTED%20VETERINARY%20MEDICINE.pdf>.

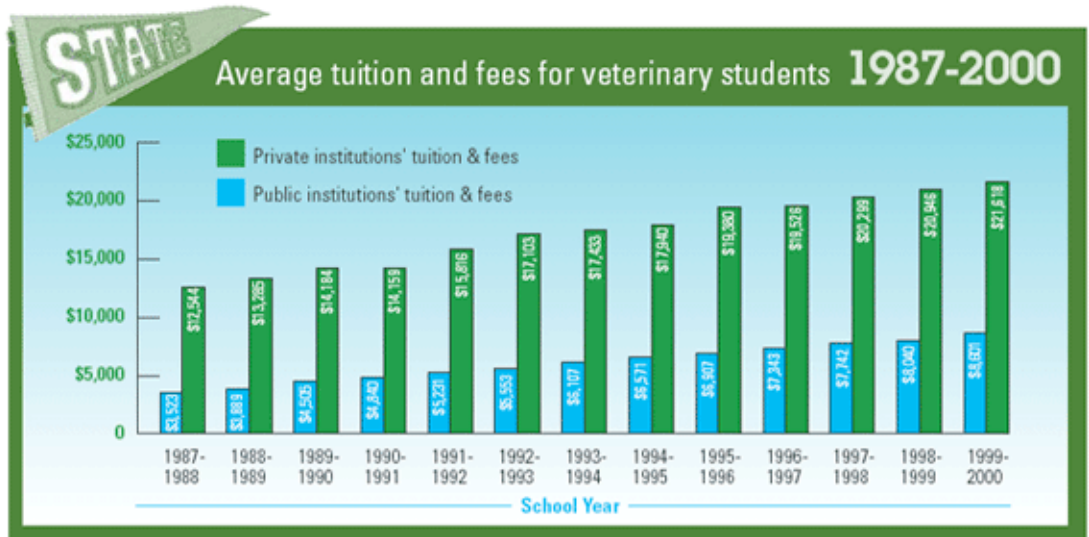
²⁷⁴ *Diversity Matters.* Association of American Veterinary Medical Colleges, 2005.

²⁷⁵ *Veterinary Market Statistics.* Association of American Veterinary Medical Colleges. Accessed February 22, 2006 from <http://www.avma.org/membshp/marketstats/usvetedu.asp>.

²⁷⁶ Brown, J.P., Silverman, J.D. KPMG LLP Economic Consulting Service. *The Current and Future Market for Veterinarians and Veterinary Medical Services in the United States.* Journal of the American Veterinary Medical Association, 1999; 215: 161-183.

²⁷⁷ Brown, J.P., Silverman, J.D. KPMG LLP Economic Consulting Service. *The Current and Future Market for Veterinarians and Veterinary Medical Services in the United States.* Journal of the American Veterinary Medical Association, 1999; 215: 161-183.

²⁷⁸ *Veterinary students bearing the brunt of state budget cuts at universities.* Accessed March 2, 2006 from <http://www.avma.org/onlnews/javma/nov02/021115a.asp>.



In combination with severe tuition increases, the income of veterinarians lags behind that of similar professions (medicine, dentistry, and law). In 1999, a study by the AVMA, the AAHA, and the AAVMC concluded that veterinary medicine is more adversely affected by increased student debt than other graduate degrees because veterinarians' ability to repay student loans lag behind other professions. This is because increases in veterinarians' incomes have not kept pace with increases in their student debts. According to the report, "while physicians and dentists have a higher absolute debt burden than veterinarians (\$71,500 for physicians, \$75,700 for dentists and \$42,800 for veterinarians in the year 1996), physicians' and dentists' ability to carry the debt has generally kept better pace with the increase in debt. Veterinarians, on the other hand, have experienced a rise in debt burden that has surpassed the increase in their incomes."²⁷⁹ Veterinarians spend between 10 and 15 percent of their monthly income to pay off their debt versus 8.6 percent for dentists and 5.3 percent for physicians.²⁸⁰ The report concluded that it is more appropriate to characterize veterinarians' debt problem as not purely a debt problem but as an income problem. The consequence to the veterinarian profession of this problem is that graduates' ability to repay student loans is lessened and they are limited to invest in personal and professional growth. Additionally, there is a failure to attract the best and brightest to the professions.²⁸¹

- *Role in Global Health:* The world's population is expected to be 10 billion by 2050. This growth will result in encroachment on animal habitat, leading to increased human interaction with wild and exotic animals. Additionally, intensified food production, globalization of the food market, changing climates and ecosystems, deforestation, dam

²⁷⁹ Brown, J.P., Silverman, J.D. KPMG LLP Economic Consulting Service. *The Current and Future Market for Veterinarians and Veterinary Medical Services in the United States*. Journal of the American Veterinary Medical Association, 1999; 215: 161-183.

²⁸⁰ Brown, J.P., Silverman, J.D. KPMG LLP Economic Consulting Service. *The Current and Future Market for Veterinarians and Veterinary Medical Services in the United States*. Journal of the American Veterinary Medical Association, 1999; 215: 161-183.

²⁸¹ Brown, J.P., Silverman, J.D. KPMG LLP Economic Consulting Service. *The Current and Future Market for Veterinarians and Veterinary Medical Services in the United States*. Journal of the American Veterinary Medical Association, 1999; 215: 161-183.

building and irrigation have increased human contact with vectors of diseases.²⁸² These exchanges of both humans and animals and animal products are contributing to increasing rates of global disease transmission. SARS, monkey pox, and avian influenza are current examples of infectious diseases that have demonstrated rapid and wide spread dispersal globally.²⁸³ Of the more than 1,700 known pathogens affecting humans, 49 percent are zoonotic, and of the 156 pathogens associated with emerging diseases, 73 percent are known to infect both humans and animals.²⁸⁴

Researched and compiled by: Kaia Sjogen, Masters of Public Health candidate, School of Public Health; graduate research assistant, Academic Health Center Office of Education

Reviewed and approved by XXXXX; Health Professions Workforce Taskforce member

²⁸² *Veterinary Medical Education and Workforce Development Act*. Accessed February 26, 2006 from <http://aavmc.org/documents/VMEWDA.pdf>

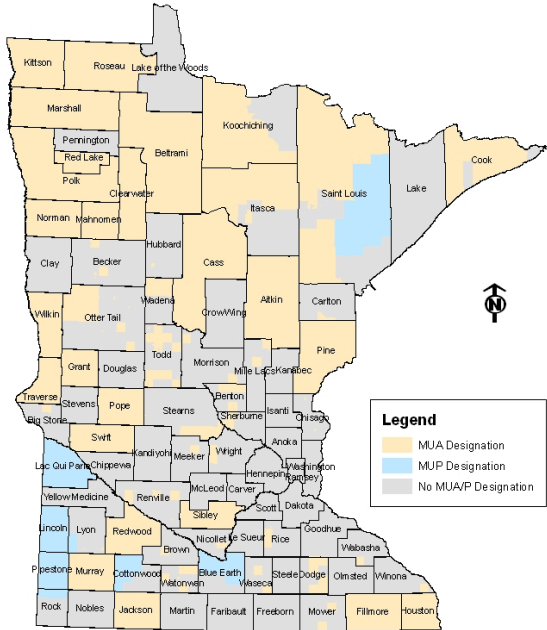
²⁸³ Becker, K. *An Epiphany: Recent Events Highlight the Responsibilities Roles and Challenges That Veterinarians Must Embrace in Public Health*. *Journal of Veterinary Medical Education*, 2003; 30:115-120.

²⁸⁴ Becker, K. *An Epiphany: Recent Events Highlight the Responsibilities Roles and Challenges That Veterinarians Must Embrace in Public Health*. *Journal of Veterinary Medical Education*, 2003; 30:115-120.

Appendix D: Workforce Trends

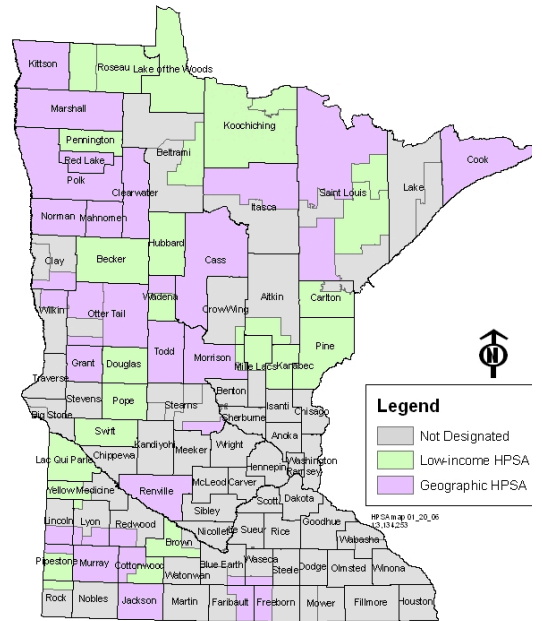
D.3. HPSA and MUA Maps

**Medically Underserved Areas (MUAs)
and Medically Underserved Populations (MUPs)**



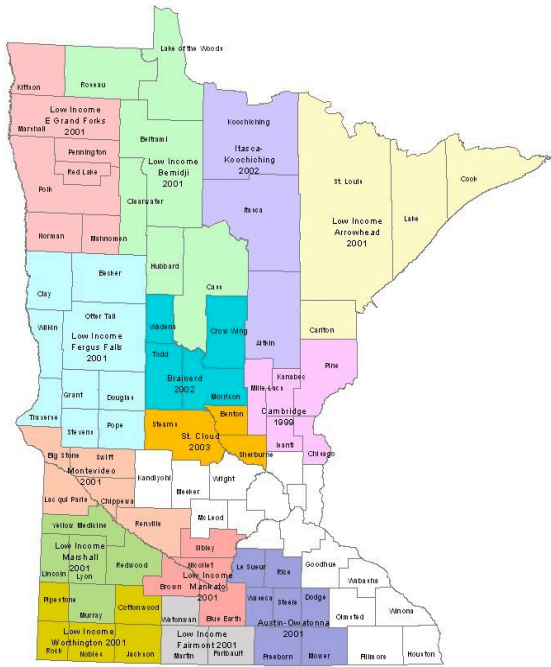
Source: Minnesota Department of Health
Office of Rural Health and Primary Care
January 2006
L:\NCFINORHPC\ArcView\Map Projects\MUA\Jan2006.mxd
1:3,400,000

**Health Professional Shortage Areas
Primary Care**

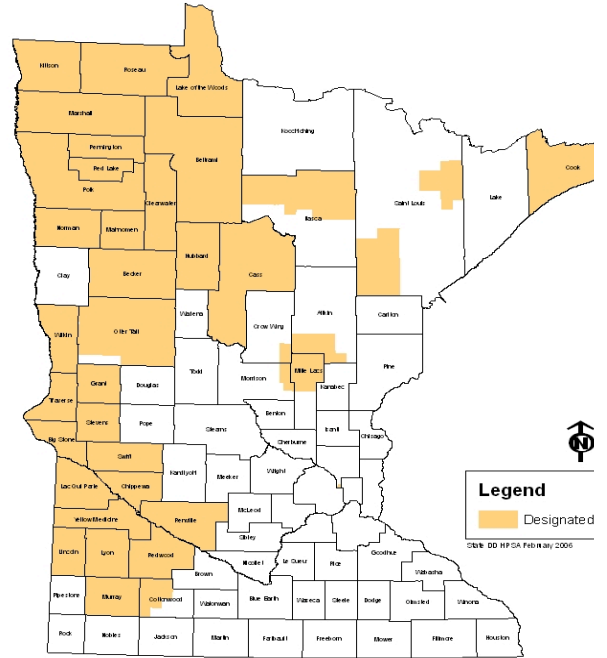


Data Source: Minnesota Department of Health; Office of Rural Health
Primary Care

Health Professional Shortage Areas Mental Health Designations

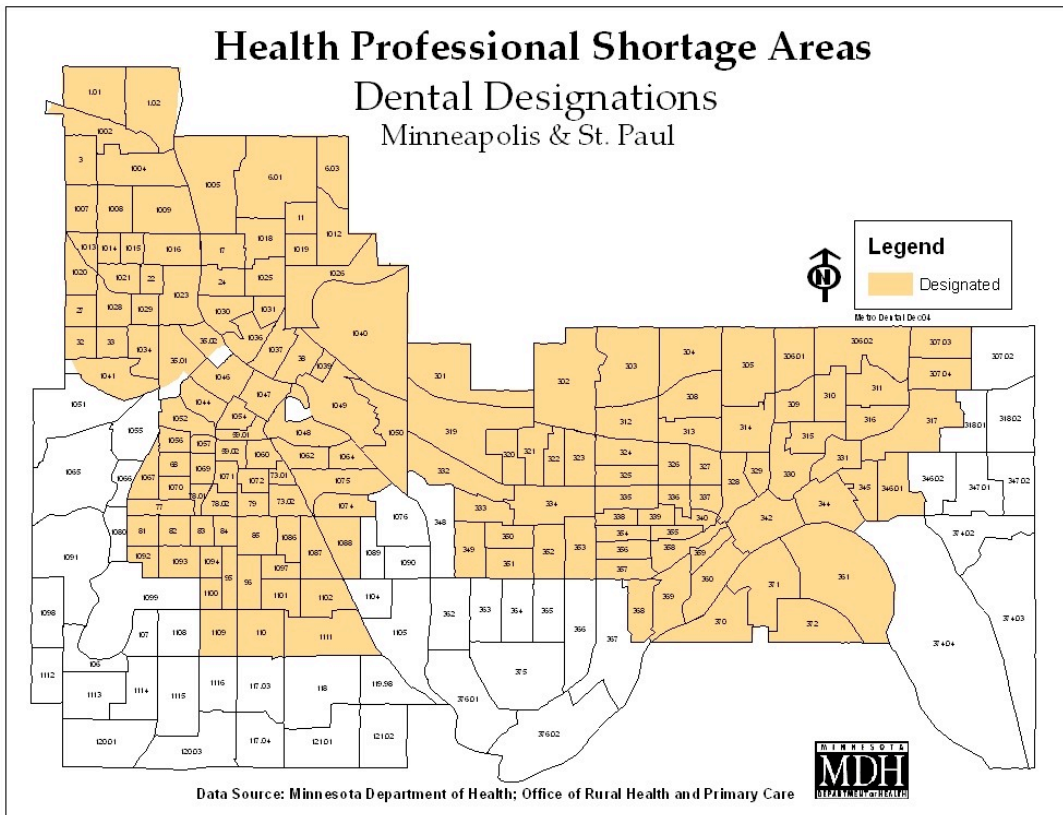


Health Professional Shortage Areas Dental Designations



Data Source: Minnesota Department of Health, Office of Rural Health and Primary Care

Health Professional Shortage Areas Dental Designations Minneapolis & St. Paul



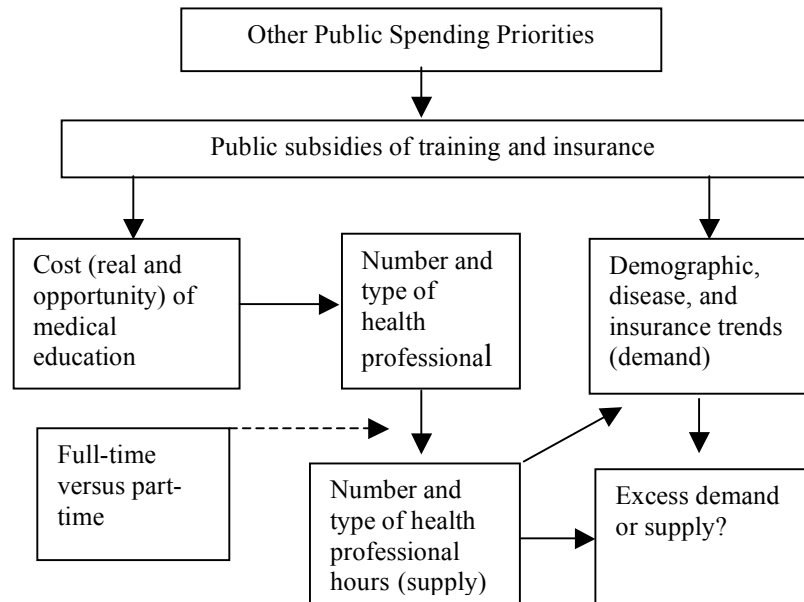
Data Source: Minnesota Department of Health, Office of Rural Health and Primary Care

Appendix D: Workforce Trends

D.4. Health Professionals Workforce Projection Model

Developed by Dr. Bryan Down

This chart depicts some of the factors that affect the supply and demand and the need for health care professions. Despite the best projections for future workforce needs, as these factors change, the workforce needs will also change. Below are listed some examples of these factors.



Examples of public subsidies of training and insurance

State support, MERC, legislative appropriations
Federal support, Medicare subsidies
Cost of medical care

Examples of costs (real and opportunity costs) of medical education

Tuition
Debt
Length of program

Examples of Part-time vs. Full-time

Economic well-being
Prevailing salaries of each profession
Gender, age of practitioner
Lifestyle and generational values of practitioner

Examples of demographics, disease and insurance trends

Age of population

Population health

Population growth

New diseases

New treatments

Uninsured rate

Malpractice costs

Examples of numbers and types of healthcare workers

Admission class size and ease of getting into program

Salary difference between professions

Number of professionals coming to MN after training in other states

Appendix D: Workforce Trends

D.5. School of Dentistry Workforce Monitoring and Alumni Survey

March 23, 2006

To: AHC-wide Task Force on the Health Professional Workforce

From: David O. Born, Ph.D.
School of Dentistry

Re: Workforce Monitoring and Alumni Survey

This memorandum responds to a request from the Task Force issued after hearing from Dean Patrick Lloyd about the School of Dentistry's alumni survey effort. I have organized this information into two parts. The first section describes the specific survey effort which is underway. The second section places the survey effort into a broader and more historical context, based on a dental workforce monitoring system which I initiated in the early 1970s.

Section One: 2006 School of Dentistry Alumni Survey

The School of Dentistry alumni survey has been designed to address two goals:

First, it will provide a stable and reliable data base of demographic and basic career information on each graduate.

Second, these data can be used as a platform from which we can launch inquiries into topics critical to institutional decision-making, to the development of workforce policy recommendations, and to the clarification of alumni feedback, service interests and other professional needs. In addition, we will be able to "mine" this data base for financial development purposes.

Final survey forms are being developed, but present questions address standard demographic concerns (age, gender, primary practice location, marital status, ethnic affiliation, type of practice (solo, group, etc.), specialty (if any), and related information on career status (practice activity level – full-time, part-time, semi-retired, etc., satellite practices, and others). The first questionnaire will also include questions relating to spouse's occupation and their role in the alum's career decisions. Finally, the career dynamics of female dentists will be explored.

Additional topics being considered for inclusion in this first round include charitable giving history or intent, continuing education interests and needs, alumni involvement in School programming, and others.

In subsequent years, information on changes in demographic information will be solicited and different “research” topics may be addressed, for example, in year two there may be reason to look into the relative ease with which graduate dentists are able to recruit and hire auxiliary personnel.

Current Status and Timetable

Our intention was to survey the most recent decade of graduates and to then add one more year’s worth of graduates and the current class of graduates with each subsequent annual survey.

Not surprisingly, the major hurdle we encountered at the very beginning was enormous inconsistency in data sources. Using data from the University Foundation, our enrollment office, the State Board of Dentistry, and the American Dental Association, we’ve managed to winnow disparate lists into a current “master” list of 880 alumni. We started with a somewhat larger group (~950) of reported alumni, but discovered that many were not in fact DDS level graduates of our program. We mailed a letter to all suspected alumni, requesting information on possible name changes and for address verification. For all persons not responding to that mailing, we mailed a 2nd address verification request (return postage paid postcard). To date we have received address confirmations or changes from 60%. The mailings to the remaining 40% of our suspected graduates have not been returned by the Post Office as undeliverable, so we believe we have accurate addresses for close to 100% of our 1994-2005 alumni. (The list resolution and address verification process has taken over a year, so we are now looking at an eleven year block of graduates for the first survey.)

We expect to have our first survey form finalized within a month and to receive IRB approval shortly thereafter. We will mail as soon as possible after approval is received. We anticipate following the initial mailing with a minimum of one reminder and most likely two. We have approximately 60 individuals who have responded positively to an option we offered that would allow them to respond via a web-based questionnaire.

Section Two: The School of Dentistry’s History in Workforce Monitoring

In the late 1960s and early 1970s, Minnesota and many other states faced workforce problems similar to those we face today, chiefly maldistribution and impending shortages of primary providers. From 1972 through the early 1980s, we designed and implemented a multi-faceted Dental Information Service Center. A pioneering effort at the time, this program applied management information systems technology to health workforce problems. There were two driving principles. First, we recognized the need for continuous (annual) monitoring of the dental workforce (ideally all categories of personnel) so that problems, trends, and policy issues could be identified. Second, we were committed to the notion that the Center had to provide services to the State and, particularly, to the persons from whom we were requesting “contributed effort” in the form of annual surveys.

We convened dental leaders, regional and national dental workforce experts, and others with direct and knowledgeable perspectives on the problems. From that conference we developed the concept for the Center and its operation.

As implemented, the Dental Information Service Center consisted of five modules:

1. The Workforce Research and Monitoring module,
2. The Practice Location Search Service,
3. The Dental Placement Service,
4. The Continuing Dental Education Assessment and Information Dissemination module, and
5. The Continuing Dental Education Participation Monitoring Service.

The Workforce Research and Monitoring module has great similarity to the School of Dentistry's current alumni survey effort. Differences include the fact that it went to all dental personnel in the state, not just U of MN alumni, and that it was a longer more practice-focused questionnaire.

The Practice Location Search Service functioned both as an instructional and a placement tool. In essence, students were taught to reflect on their needs and desires with respect to ultimate practice location. This information was quantified and then matched against a data base of roughly 300 Minnesota communities which, theoretically, represented viable practice locations. Students received descriptive print-outs (50+ variables) which described each community. They could then reconsider their choices and conduct additional searches, or they could investigate specific communities using a small library of information we maintained and through contacts in each community. Communities in the profile system may or may not have actually expressed needs for additional dentists.

The Dental Placement Service can most easily be compared to a computerized dating service for dental graduates in search of specific positions. While the Practice Location Search Service described above was designed to teach students about career decisions and practice locations, the Dental Placement Service was designed to match graduates with actual opportunities. Students could register and express interest in associateships, practices for sale, office space for rent, salaried positions and communities "in need." Likewise, dentists in practice could list position openings and other practice opportunities, and community recruitment groups could register their needs as well. (This system also served dental hygienists and dental assistants.)

The Continuing Dental Education programs were designed to address two needs. First, through the workforce monitoring system, we were able to collect information on desired continuing dental education course programming. We were able then to pass that information on to CDE programming staff and direct course promotional mailings to dentists on a regional basis when courses of interest were being offered. The second

CDE module (Participation Monitoring) was designed as Minnesota was first moving into mandatory continuing dental education. We were asked to create a system that would serve as a monitoring and recording service for the State Board. Events overtook both of these modules and while they were designed, programmed, and tested, they were not implemented.

I might note that when these systems were created, we were working on mainframe computers and programming in FORTRAN and Cobol. Later, we used some of the first portable computer terminals (essentially teletype-like machines). Data base resources like those available today were virtually non-existent and, when they did exist, were extremely expensive and cumbersome to access. The World Wide Web was not yet a gleam in Al Gore's eye.

Over the years, the Dental Information Service Center's placement service attracted the attention of the AHC and health professional programs elsewhere. With AHC support, we served some 23 health occupational fields in Minnesota for several years. Later, under a variety of funding sources, we extended services to some or all of those occupations to 11 states in the central region. In 1979 we received 1.2 million dollars in funding from the American Dental Association and the Kellogg Foundation to establish a national dental placement program. This effort was terminated in 1981, largely as a result of national political concerns surrounding the perceived surplus of dentists and the "saturation of local markets."

The Dental Information Service Center addressed multiple needs and achieved a number of successes. Among others, it helped communities and the dental profession jointly address access issues; it resolved "dental manpower shortage areas,"²⁸⁵ placed graduates, and facilitated many practice transfers; above all else, it demonstrated the School's commitment to the public good.

I've sketched the outline of what was a comprehensive monitoring system, one designed to address the needs of multiple constituencies. There is, of course, much more which could be said. I would be more than happy to expand on this report, to answer specific questions, or to assist the AHC in its efforts to develop a monitoring system.

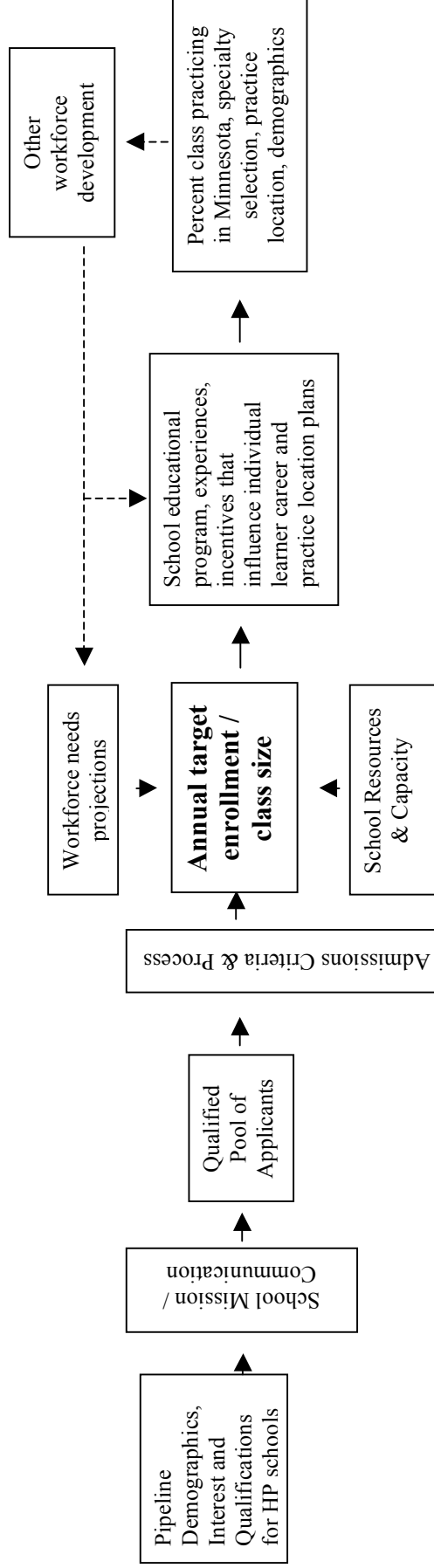
Submitted respectfully,
David O. Born, Ph.D.

²⁸⁵ In 1973, Minnesota had 23 counties federally designated as dental manpower shortage areas. Within three years, we had addressed all needs for dentists, save two communities, Brown's Valley and Floodwood. In addition to our computerized services, a curriculum component which addressed career decision-making and rural dentistry contributed to this success.

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Appendix E: Student Information

E.1. Health Professions Education Model



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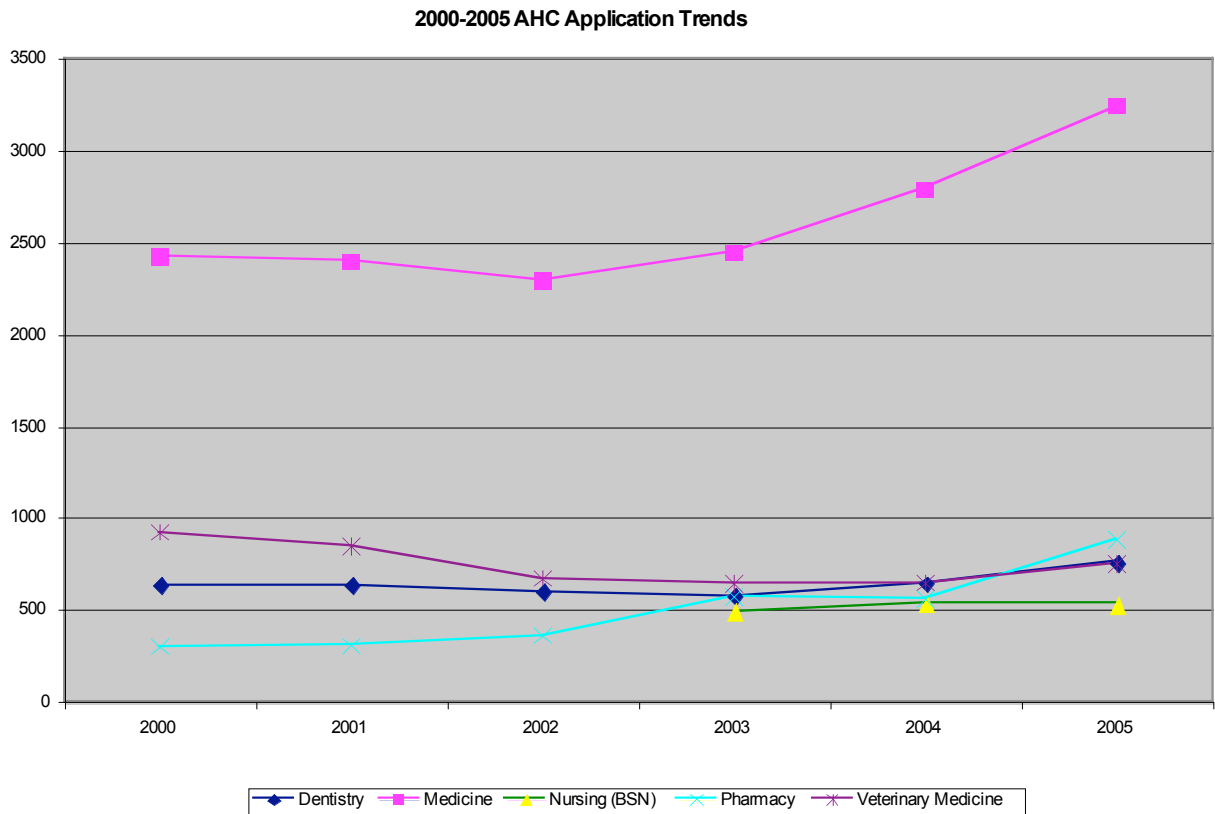
Appendix E: Student Information

E.2. Data from the AHC Schools

The Excel files that make up Appendix E.2. are attached in a separate file. Note that these Excel files will print on legal size paper.

Appendix E: Student Information

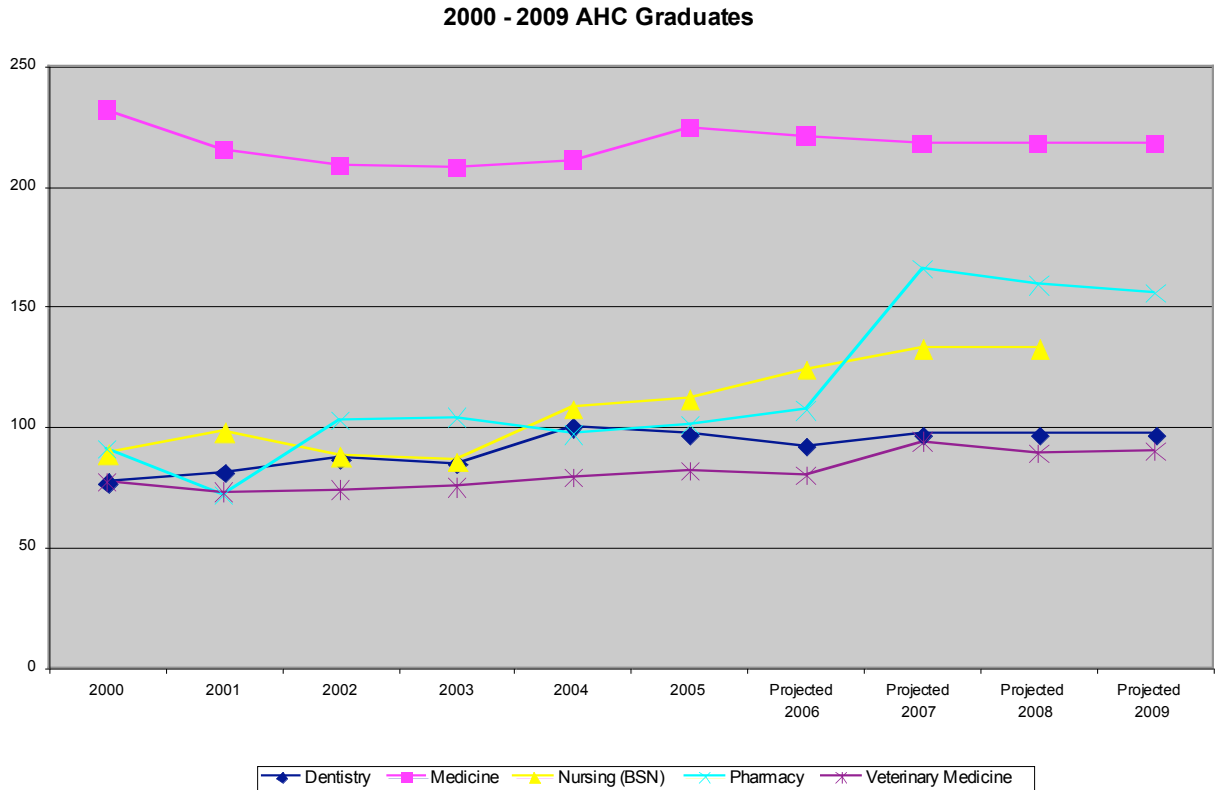
E.3. Application Trends



Data from the School of Public Health were submitted as the report was being completed. Because the nature of the programs in public health is somewhat different, analysis of these data will be incorporated into the final report. To date, the School of Nursing has not submitted the advanced nurse practice and doctoral program data.

Appendix E: Student Information

E.4. 2000-2009 Graduates



Data from the School of Public Health were submitted as the report was being completed. Because the nature of the programs in public health is somewhat different, analysis of these data will be incorporated into the final report. To date, the School of Nursing has not submitted the advanced nurse practice and doctoral program data.

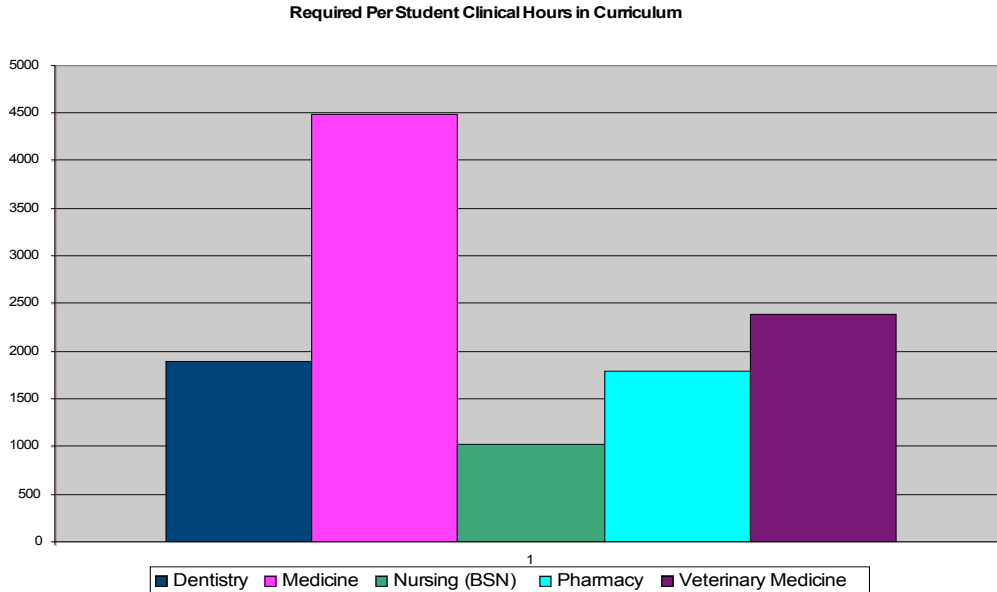
Appendix F: Community Partnerships

The second charge of the Health Professional Workforce forced on community partnerships; specifically it is:

Define the role of the University in the community partnerships necessary to educate and train the next generation of health professionals. Delineate principles for partnerships, the infrastructure necessary to sustain these partnerships, educational control, and accountability systems.

Academic Health Center schools have a symbiotic relationship with the health systems and other community agencies to develop the next generation of the health professional workforce. As evidenced by data, those systems are dependent upon our programs for graduates to sustain and continue developing the workforce. On the other hand, our schools are dependent upon community organizations for students to complete the required clinical hours in educational programs. The data collected from five schools (dentistry, medicine, nursing, pharmacy, and veterinary medicine) in the Academic Health Center confirms that clinical education required by accreditation agencies is a significant part of the Academic Health Center educational programs. Each student must spend a significant number of hours in such organizations as hospitals, clinics, community agencies, and pharmacies to complete required hours in order to graduate and sit for licensure board examinations. Below is a representation of the number of hours that each health professions student is required to spent in clinical education to complete

degree requirements and sit for national and state board examinations.



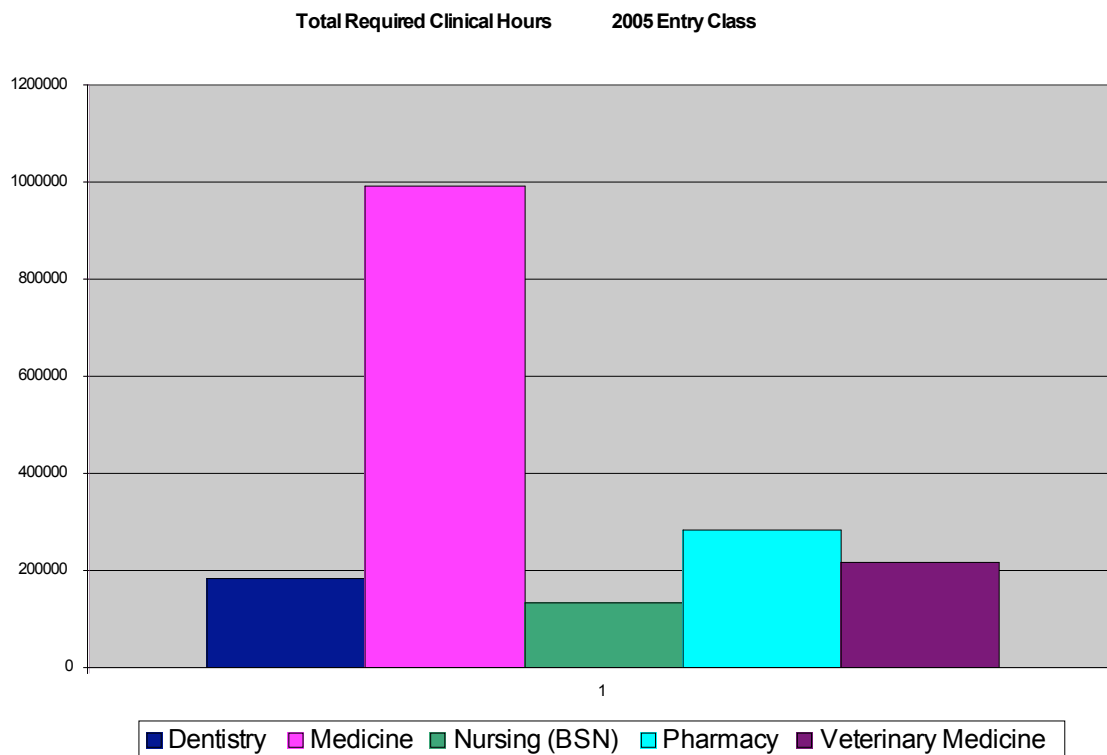
In addition to numbers of hours, some accrediting agencies, notably the Liaison Committee on Medical Education, requires students to see a specified number and particular types of patients during their educational experience.

Three schools (medicine, nursing, and pharmacy) are significantly dependent upon external organizations for placement of students into clinical rotations. Two schools (dentistry and veterinary medicine) primarily place students in University teaching sites: The School of Dentistry dental clinics and the University of Minnesota Veterinary Medical Center. In the School of Dentistry, there is a growing appreciation this setting provides a unique view of clinical practice that may not reflect student's future practice. Therefore, the School has initiated relationships with other dental clinic settings to implement a requirement in the 2006-2007 academic year that each dental student complete two months clinical rotations in community settings.

Required clinical hours in the AHC educational programs vary in their nature and placement in the curriculum. For example, some accreditation agencies now recommend that pre-health science students have experience in health care systems prior to acceptance to a health professions schools. Other agencies now require a continuum of experiences beginning in the first year of school through graduation. First year students may be required to "shadow" clinicians, while fourth year students are expected to

participate in the care of patients and demonstrate competence. Some schools send students on rotations for blocks of time at the end of the education program; while others integrate clinical rotations with didactic, classroom courses on-campus. Taking these requirements as a whole, the number of required clinical hours in the Academic Health Center is staggering. The impact on both AHC schools for placement and oversight and health organizations for teaching and management responsibilities is immense. For the latter, the level of commitment and impact is exponentially exacerbated by fulfilling requests for clinical placements from many non-University of Minnesota institutions. For examples, attempts in nursing have been made statewide to coordinate clinical experiences across the eighteen nursing schools.

Below is the total number of hours for the entry 2005 class throughout their education in AHC schools. Schools are responsible for placing students in qualified rotation sites.



Community-based Faculty Issues

Because students are learning complex diagnostic and treatment, administrative or other skills expected of health professionals that require high-level judgment that is developed over time, health professions education is individualized and intense. In some cases the ratio of student to mentor is regulated by accreditation standards or by patient safety concerns in healthcare organizations. Students learn values and behaviors in apprenticeships with individual practitioners in patient care and community settings and/or in small groups rarely exceeding a 3:1 ratio.

Each AHC school and college has different and widely variant procedures and systems in place for identifying, appointing, promoting, recognizing and rewarding their community-based faculty. These faculty are called varying titles: adjunct faculty, voluntary faculty, clinical instructors, preceptors, community faculty, mentors, affiliated faculty, to name a few. For purposes of this document, the term **community-based faculty** refers to individuals that provide a faculty/teaching role for health professions student in something other than a full-time capacity off-campus and/or in an affiliated setting. These individuals are often referred to as preceptors, adjunct faculty, voluntary faculty, affiliated faculty, community faculty, and clinical instructors to name a few. In total, community-based faculty play an integral and vital role in the education of health professions students and are responsible for a growing portion of our health professional student's education while at the University of Minnesota.

Such faculty frequently identify themselves a "University of Minnesota faculty" without oversight or support from the AHC. As a result, the ability of schools to identify, communicate with and support their community-based faculty is equally variable. Often schools do not communicate expectations for faculty appointments or provide opportunities for promotion and advancement in faculty rank. While schools have created varying levels of preceptor recognition, traditional university awards are typically unavailable to recognize contributions and excellence. One important aspect of support needs to be improved relates to access to important educational resources through the Health Sciences Library. Additionally, challenges exist for overextending resources to health professionals who may or may not be participating actively or effectively in the teaching/learning mission of AHC schools. As the University adopts a new internal budget model, this issue becomes increasingly important to address.

Rotation Administration

For the most part, how the Academic Health Center schools handle clinical placements and administer experiential rotations might best be characterized as “traditional”. Each school and program operates independently placing students in rotation sites using a variety of contracts and administration systems. The work load for oversight of the experiential portion of the educational programs is significant for both AHC schools and community organizations. In addition to student placement, as required by some accreditation agencies, programs must have in place clinical affiliation agreements outlining contractual and educational requirements. In 2002, the AHC Office of Education staff worked with the schools and the University of Minnesota Office of the General Council to develop a common affiliation agreement form. Using this document, schools initiate the process with community sites, develop individualized affiliation agreements tailoring a template form, receive signatures from the organization, and send the agreement to the Office of the Senior Vice President for Health Sciences. Dr. Cerra signs each form which is manually entered into an affiliation database managed by the AHC Office of Education staff. Currently, there are 1792 active affiliation agreements on file for AHC schools and programs. These agreements have varying lengths of time (e.g., 2 – 5 years) that they are valid before the process needs to be repeated for each.

Clinical experience in an educational program is an important developmental time for students. While post-graduate training is available in all health professions for graduates to continue to specialize, only medicine requires it through medical residencies. Therefore, other schools are charged with educating a health professional that is practice-ready upon graduation from the University of Minnesota. Educational quality controls such as communicating expectations and evaluating experiences for students, preceptors and sites are vital to assure students have a valuable experiences, are exposed to positive role models, and master competencies expected for them upon graduation. This communication takes the form of syllabi, program materials, websites, e-mails, telephone calls, preceptor training, library access, etc. This oversight involves administrative support as well as academic faculty support. The taskforce did not assess these

interactions across the AHC but has the sense that the nature and quality significantly vary.

In addition to educational quality assurance, the state, federal, and agency accreditation regulatory requirements for clinical and experiential education are also increasing. Examples of these requirements include criminal background checks, immunization requirements, risk management issues, drug testing, Health Insurance Portability and Accountability Act (HIPAA), student health insurance, new Joint Council on Accreditation of Healthcare Organizations requirements, among others. As common needs across schools and programs have arisen, the AHC Office of Education has convened an internal experiential education group, comprised of approximately faculty and staff with responsibilities for clinical rotation oversight. Since 2001, together this group has identified a number of shared issues and has worked through several common challenges such as the development of a common affiliation agreement with the Office of the General Counsel and implementation of an all-AHC immunization registry delivered to individual students through the My U portal with Boynton Health Service. The group has been working on a more efficient affiliation agreement database system and has discussed common preceptor training initiatives. At this point, these initiatives have been entirely voluntary, driven by individual needs and interests, and have not been formalized.

Costs of Clinical / Community-based Education

The cost to deliver clinical education to higher education and health and community settings is substantial. Revenue and cost recovery in Minnesota takes the form of direct site compensation from the state's Medical Education and Research Cost (MERC) funds, described under the Charge 3, Financing Section. Currently, only one school, the College of Pharmacy, compensates preceptors per rotation for teaching pharmacy students. These costs are passed through to the pharmacy students in tuition and fees during the fourth, experiential education, year of the pharmacy program. The HPW taskforce worked with Elizabeth Nunnally, Chief Financial Officer of the Academic Health Center, to collect available data to estimate both educational costs and sources of revenue for community-based education. She conducted a high-level analysis of the costs borne and revenues received by community sites throughout the state to educate health professional students. This analysis necessarily incorporates a series of assumptions. The analysis looked at three sources of revenue: DME and IME (both of which support medical resident education in hospital sites), and MERC (which supports

graduate level Nursing, Medicine, Dentistry and Pharmacy students and residents at a variety of clinical sites throughout the state).

Method to determine funding to community sites:

The estimate of DME and IME to community sites throughout the state was derived by calculating per resident IME and DME rates at Fairview and multiplying that by the total number of residents at other University of Minnesota affiliated hospital sites. Total MERC revenue is the actual MERC revenue for FY2005 for University of Minnesota affiliated training sites.

Method to determine costs to community sites:

The costs of training health professional students in community sites depend on the number of students who work with a particular preceptor for a particular period of time. Hence, this analysis creates “bookends” for thinking about the ratio of students to preceptor. The attached table lays out three scenarios – 1/1 ratio, 2/1 ratio and 3/1 ratio. Using industry average salary figures, and estimating indirect costs, we derived a total estimate for the costs of community education. The preceptor salaries and associated indirect costs were discounted to 25% of total to adjust for lost clinical productivity and associated billing opportunities.

Based upon available data on those professions covered by the MERC funding, data was extracted from the state database. Table I represents a high level summary of revenue and costs of community education for University of Minnesota Health Professional Students and Residents. Using the midpoint of the analytical bookends, estimated total costs of clinical education in the community for these professions in preceptor time, indirect costs and resident contract is \$101 million based upon these dates and is represented in Chart 3. The estimated unfunded costs to the community for educating health professional students is \$37 million. Clearly, the costs of education already exceed the fragile sources of revenue to compensate the teaching contributions of the AHC health systems and community partners. Much of this cost is borne by individual community-based faculty.

**Table I:
HIGH LEVEL SUMMARY OF REVENUES AND COST OF COMMUNITY EDUCATION
FOR UNIVERSITY OF MINNESOTA HEALTH PROFESSIONAL STUDENTS / RESIDENTS**

	<i>BOOKENDS</i>		
	1/1 Ratio	2/1 Ratio	3/1 Ratio
Funding to Community Sites:			
DME (Estimated)	\$ 9,900,000	\$ 9,900,000	\$ 9,900,000
IME (Estimated)	\$ 31,500,000	\$ 31,500,000	\$ 31,500,000
MERC	\$ 22,400,000	\$ 22,400,000	\$ 22,400,000
Total Revenues	\$ 63,800,000	\$ 63,800,000	\$ 63,800,000
Costs to Community Sites:			
Preceptor Time	\$ 92,000,000	\$ 46,000,000	\$ 31,000,000
Indirect Costs	\$ 29,000,000	\$ 15,000,000	\$ 10,000,000
Resident Contracts	\$ 40,000,000	\$ 40,000,000	\$ 40,000,000
Total Costs	\$ 161,000,000	\$ 101,000,000	\$ 81,000,000
Unfunded Community Costs	\$ (97,200,000)	\$ (37,200,000)	\$ (17,200,000)

Note: This summary provides bookends for talking about the unfunded costs of community preceptor education of University of Minnesota health professional students and residents.

Source: Elizabeth Nunnally, Office of the Senior Vice President for Health Sciences,
March 2006

Chart 3: FY05 Costs of Community Education are \$101 M

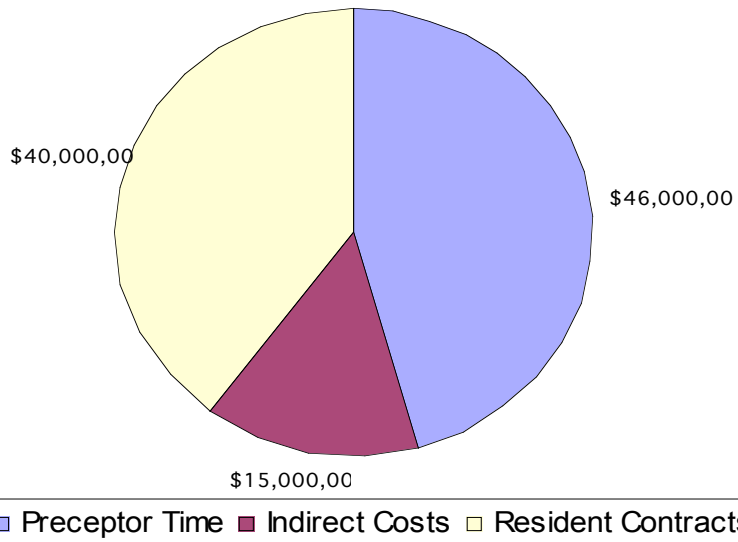
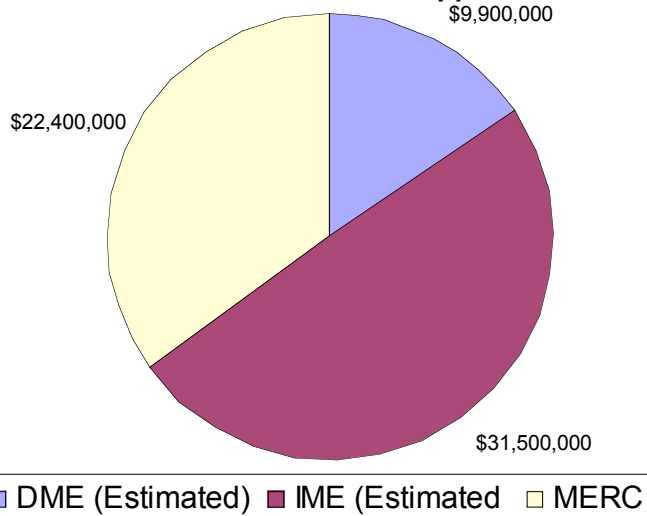


CHART 4: FY05 Revenue \$63.8 M to Support Costs of Education



Source: Elizabeth Nunnally, Office of the Vice President for Health Sciences, March 2006

Promising Academic Health Center Partnerships

Beyond traditional experiential education and rotations to fulfill educational program requirements, the Academic Health Center has worked on a number of partnerships to promote teaching students while addressing community, organizational, health system or other needs: achievement of workforce goals, care for underserved populations, community service projects, quality initiatives, team approach to care, among others. Student placement in clinical and community sites range on a continuum: traditional rotations with a health professional where students are expected to master competencies to engaged community-campus partnerships that are well developed in which students, faculty and community members are full and equal participants in engagement.

An approach has been to promote “shared resources/shared risks/and shared rewards” while educating students in clinical rotation. Programs intentionally engage University of Minnesota programs such as Minnesota Extension Services to work on common education and health issues together. Some of these partnerships have created significant outcomes that benefit both partners. These include:

- The Rural Physician Associate Program (RPAP), a program with a goal toward rural physician workforce development for example, offers third-year medical students an opportunity to participate in a nine-month, community-based educational experience in rural Minnesota primary care. Of the 1127 RPAP graduates currently in practice, 64 percent practice in Minnesota; of those physicians, 63 percent practice in rural communities. For more information:www.rpap.umn.edu
- In 2001, the School of Dentistry worked with the City of Hibbing and the Hibbing Community College to open the Hibbing Clinic. Dental and dental assistant students are educated together and serve an average of 150 dentally underserved patients each week. The number of dental graduates who have chosen rural practice has increased. The School is now working with Rice Memorial Hospital, Willmar, to develop a similar community-based model that benefits both the community while meeting educational requirements for dental students. .

- The Minnesota Area Health Education Center (Minnesota AHEC) is a developing statewide network of community and academic partners committed to meeting the health professional workforce needs of greater Minnesota, established in September 2002. This is done through strong community-campus partnerships with academic institutions, health care agencies, communities and others committed to improving the health of the people of Minnesota. The Minnesota AHEC addresses the pipeline for health professions by nurturing an interest in health careers among youth through the support of students, career counselors and others who influence student exploration. The centers support disciplinary, interprofessional and community-based education for health professions students in medically underserved areas and also support community-based faculty and other health professionals in greater Minnesota through continuing education and other services that enhance their professional growth and support life-long learning. For more information, go to <http://www.mnahec.umn.edu/>
- The two-day conference “Leading Change: Strategies for a Vital Health Professions Workforce,” hosted by the Academic Health Center in April 2005, focused on seeking community-based, regional strategies for invigorating and supporting the next generation of the health professions workforce. Twenty community teams participated in this conference. (For conference proceedings, visit http://www.ahceducation.umn.edu/OofE/workforce/conferences/Leading_Change.html)
- The Walker Methodist Health Care Center and the University of Minnesota’s Interprofessional Teaching and Practice Team (U-Team) partner in the Transitional Care Unit (TCU), a skilled nursing care unit specifically designed to provide post-acute care allowing the smooth transition between the acute care setting and a less intensive clinical care setting. Evaluation data shows this is an effective academic-community partnership that provides improved patient outcomes.
- The College of Pharmacy and the School of Nursing have worked with healthcare systems to address workforce shortages. With the mission to address Minnesota’s rural workforce shortages, the College of Pharmacy is developing hubs through out the state for student placement and community engagement. The School of Nursing is collaborating with Mayo Clinic and the University of Minnesota – Rochester to

address the need for Baccalaureate level graduates and is working to increase advanced nurse practice educational opportunities.

- **Adopt the national Community-Campus Partnerships for Health Principles for community-campus partnerships**

Principles of Good Community-Campus Partnerships

1. Partners have agreed upon mission, values, goals, and measurable outcomes for the partnership.
2. The relationship between partners is characterized by mutual trust, respect, genuineness, and commitment.
3. The partnership builds upon identified strengths and assets, but also addresses areas that need improvement.
4. The partnership balances power among partners and enables resources among partners to be shared.
5. There is clear, open and accessible communication between partners, making it an ongoing priority to listen to each need, develop a common language, and validate/clarify the meaning of terms.
6. Roles, norms, and processes for the partnership are established with the input and agreement of all partners.
7. There is feedback to, among, and from all stakeholders in the partnership, with the goal of continuously improving the partnership and its outcomes.
8. Partners share the credit for the partnership's accomplishments.
9. Partnerships take time to develop and evolve over time

Source: <http://depts.washington.edu/ccph/principles.html>

2. Approve a process to conduct a comprehensive analysis of the appointment process for community-based faculty. The goal would be to collaboratively design specific recommendations and intended outcomes that will allow for the development of a comprehensive AHC-wide system for community-based faculty connected to the Academic Health Center through its schools and colleges. Aspects of the comprehensive system should incorporate and address the following key areas of emphasis:
 - Recruitment: defining minimum qualifications for community-based faculty across AHC schools and defining goals of community partnerships
 - Appointment: developing common procedures for appointment and promotion of community-based faculty based on excellence in teaching
 - Management: identifying data needs and information systems necessary to manage community-based faculty across AHC schools and developing contracts that define expectations based on principles and orientation procedures

- Communication: identifying strategies to maintain and improve communication between AHC, schools and colleges and community-based faculty including participation by community-based faculty in academic responsibilities such as development of curriculum and evaluation of competencies
 - Recognition: defining non-monetary rewards and recognition guidelines to support the retention and continuous professional development of community-based faculty across the state, for example, access to library resources.
 - Support: defining minimum standards and procedures to successfully support community-based faculty in their role as educators, including educational development, financial or non-monetary resources, in addition to access to library resources and services.
 - Evaluation: developing appropriate evaluation systems for community preceptors and sites
3. Develop a strategic plan for community partnerships with an infrastructure that includes principles of partnership, contracts that define the level of partnership and associated responsibilities and resources for support. This partnering may include timely consultation on educational, financial and health care issues. Regional campuses or resource centers may be developed to support these partnerships.
 4. Support the development of campus-community partnerships at all levels including the creation of appropriate promotion and tenure credit for developing and rewarding campus-based faculty for this work, and support for development of educational methods that are innovative, learner-centered, flexible, and evidence-based and interprofessional.
 5. Assure accountability in the contractual partnership defined as bi-directional, with the ultimate accountability toward meeting the students' needs and the communities' health care needs. Outcomes measures should be developed up front and outlined in the contract.

Appendix G: Interprofessional Education

In the September 21, 2005 letter to the Health Professional Workforce Task Force, Dr. Frank Cerra charged the group to consider the role of interprofessional education in training the next generation of health professionals. The specific charge is:

Define the role and the best use of interprofessional education in the education and training of the next generation of health professionals. Delineate new interprofessional education and care delivery models, the scope of their use, barriers to their use and approaches for overcoming those barriers, and how the models would be financially supported.

Below is a discussion of the background of interprofessional education in the Academic Health Center, the current status of its implementation into educational programs, and recommendations for future directions and recommendations.

Background

The primary role of health professional schools is to educate and train the next generation of health professionals. The ability of a health professional to function starts on day one, when the student enters the school. The care-delivery system has recognized the need for health professionals who understand systems and their roles in them, make decisions based on evidence and best practices, can use electronic information systems, value and promote patient-centered care, and can effectively work with other providers as needed. Therefore, training or lecturing to students on one profession in isolation from the others is thought to be no longer adequate.ⁱ In the United States, educating professionals together to work in teams through interdisciplinary education has been discussed and attempted for over thirty-five years. But this form of education has been elusive, with only the development of various projects and programs. The overall system has not been transformed because perhaps interprofessional education has been considered only a “nice thing to do”.

Recently, renewed national and international efforts focus on improving the health care system through more effective collaboration and interprofessional education strategies.^{ii, iii, iv} The more recent and preferred term for collaborative, interdisciplinary education is now interprofessional education. This term more accurately reflects the

intent of multiple professions such as nursing, medicine, pharmacy, etc. working together rather than intra-profession such as specialties in medicine.

At the University of Minnesota, interprofessional education in the health sciences isn't a new idea, either. In fact, our Academic Health Center was established upon this platform:

“Discussions with students disclosed the desire to see far more emphasis on the “team” approach to providing health care. Students assert that if future health care delivery systems require a team approach to provide the necessary services, today’s health student must be exposed to this approach in his educational experience. Currently, students are dismayed over the lack of dialogue among the various professions . . . Student recognize the impossibility of training all professionals in the same courses and program, but emphasize the necessity of integrated training when practical.”^v

What progress has the University of Minnesota Academic Health Center (AHC) made in thirty-five years? Initially, we made some commitments to facilities that are connected between schools and implemented several free-standing programs. There were attempts at voluntary interdisciplinary coursework and efforts by individual faculty. “Interdisciplinary time” was scheduled during the week; however, delivery of interdisciplinary courses was not mandated. This time block eventually eroded into free or study time.^{vi} A 1990 evaluation of the AHC, *A Look Back and A Look Ahead*, described “missed opportunities or unfinished business” of the AHC’s lack of commitment to foster the “team” approach in health professions education and health services delivery.^{vii}

Despite our lack of progress, our students’ commitment has not wavered — as evidenced by the continuing strength of the thirty-five year old Center for Health Interdisciplinary (now Interprofessional) Programs (CHIP), a cross-collegiate student support and leadership organization housed in the Office of the Senior Vice President for Health Sciences. When the AHC was first established in the early 1970s, the administrators funded CHIP to promote extracurricular collaboration of students across the University of Minnesota’s health professions schools. . . Unfettered by bureaucratic barriers such as curriculum committees, course scheduling and room availability, this student-run organization has reached out to other health-related students across campus and has kept the ideal of interprofessional interaction alive and well to this day. Many

collaborative CHIP programs such as bioethics seminars, global health retreats, patient safety workshops and peer-to-peer alcohol and drug awareness education predated inclusion in formal school curricula. The number of interprofessional and cross-collegiate educational activities and courses continued to increase during the 1990s. Today, CHIP has established a branch unit for the Duluth-based medicine and pharmacy programs in collaboration with St. Scholastica.

In 2000, the Academic Health Center created a vision and strategic plan that committed to implementing interprofessional education across the health professions schools. That year, the position of Assistant Vice President for Education and the AHC Office of Education were created to lead cross-collegiate efforts.^{viii} In May 2001, the

AHC Office of Education hosted a conference that identified a number of interprofessional activities and barriers to implementing IPE. Over the course of time, numerous groups and committees have formed to promote cross-collegiate educational activities, and attempts have been made to address these barriers. For example, in 2004, a consultant reviewed the activities and tuition attribution models and made recommendations for addressing funding models for IPE.^{ix} What has been the result of this activity? In October 2005, an inventory of interprofessional education across the AHC

Barriers to IPE - May 9, 2001

- Unaware of courses & activities across schools
- IMG / tuition attribution / financial issues
- Lack of incentives (faculty rewards in P & T, monetary)
- Logistics within and across schools
- Academic Schedules
- Integration into existing curricula
- Institutional commitment
- Fear of losing scope of practice
- Too much passive learning – must be active
- Professional culture and language
- Need for faculty development
- Lack of understanding goals

was compiled and identified numerous cross-collegiate experiences with sixty-three unique activities that based upon criteria developed by a faculty group can be considered “interprofessional” and promotes collaboration across health professions. Many AHC-wide interprofessional activities are quite effective and highly regarded; however, the majority of these are extracurricular, again having failed to transform the educational system in the AHC.

Task Force Information Gathering

To further understand interprofessional education in the AHC, taskforce representatives conducted several information gathering sessions: meetings with the associate deans for education, the individuals charged with administration of education in their schools; the student consultative committee; and a February 24 interactive session with faculty and students who have participated in interprofessional education in the AHC. These sessions confirmed that: (1) no formal curriculum between schools exists to teach student about other health professions, collaboration, or the team approach; (2) the barriers to implementing IPE for the most part continue to remain; and (3) passionate faculty and students continue to drive the significant investment and outcomes of interprofessional work.

Health Professional Workforce Task Force Discussions

In reflecting upon the charges, the HPW Task Force has recognized that the workforce data on health professions collected by individual health professions and continue to be located in “silos”. In quantitatively projecting the future workforce needs, task force members recognized that the health care system in this country is considered to be broken, and that once again a commitment to collaboration across health professions has emerged in the name of quality, patient safety, and high performance, among other values for health care. A number of discussions ensued regarding transforming the AHC by developing a “team” focus. This team focus will include advocating for teams to transform the health care system, by describing the importance of IPE formally in the AHC mission, and by creating incentives and rewarding team development in clinical, research and educational settings. The statements reflect the task force values regarding interprofessional collaboration across health professions to guide education:

1. Health science professionals provide distinct but overlapping layers of health care in order to provide continuous, longitudinal, responsible and accountable care to patients, the public and communities.

2. In order to achieve the high quality of care towards which all health science professionals strive, we recognize that much, but not all, of our work should occur in interprofessional teams.
3. Practitioner development in the health science professions is based upon a desire to provide the best health care for patients, the public and communities. The major root cause of medical error is miscommunication.^x; The major remediation for miscommunication is understanding, respect for and practice within a team of health care providers.ⁱ
4. Faculty, students and staff have developed numerous effective interprofessional offerings across the Academic Health Center through personal commitment and creativity. Several of these models are highly regarded nationally. While valuable, these efforts have yet to transform the educational system of the six health professions schools of the University of Minnesota.
5. The University of Minnesota Academic Health Center is uniquely positioned by structure, intent and experience to transform health professions education and practice through nationally and internationally recognized models of health professions education and scholarship.

Recommendation:

1. Review Academic Health Center materials such as the mission and values statements to determine whether they communicate “interprofessional”, “interdisciplinary” and/or “team approach to care” reflective of new models of collaboration and quality improvement, consistent with expectations of health care systems.

Signature Interprofessional Learning Foundations

As noted, a group of interprofessional faculty from different health professions schools in the Academic Health Center have mapped over 63 distinct current health professional students’ learning experiences in or about interprofessional teams. It was discovered that most of these opportunities are extracurricular. We have not yet determined the best opportunities for true interprofessional learning experiences across the AHC schools’ curricula, or along the continuum of learning within a particular profession. Among these experiences are four exemplar programs which could form the basis for a Signature Interprofessional Experience at the University of Minnesota AHC:

CLARION. This student-run CHIP committee program was first developed in 2001 to teach quality improvement, team development, and interprofessional collaboration. Four

faculty (Sandra Potthoff, School of Public Health; Karin Alaniz, School of Nursing; Don Uden, College of Pharmacy; and Karyn Baum, Medical School) with the CHIP Director (Jenny Meslow) have provided guidance and engaged health system administrators to work with students. The local team-based case competition has grown into a national case event in which ten academic health center teams will compete in April 2006. Students have raised over \$60,000 to award scholarships and defray event costs. Most students who participate generally do not receive credit for participation, nor do faculty volunteers receive remuneration or formal recognition. CLARION students and faculty have recently published an article in Academic Medicine describing this novel interprofessional approach to health care education.^{xi}

Interprofessional elective. In the Fall 2005 semester, a four-school interprofessional team course was developed and incorporated into the Medical School Physician and Society (PAS) course. Approximately 400 students participated. The medical students were required to take the course while the other schools offered it as an elective. The course incorporated multiple formats including traditional lecture, workshops, web-based, and small group learning. Generally, participants have recommended a number of changes that need to be made to improve this effort; but all involved agreed that the course offering was a valuable first step. The course will be offered and expanded in the Fall 2006 semester. Again, students receive credit, generally all faculty involved participated in this course in addition to their regular work load. Course coordination and responsibility for oversight are passed from one school to another.

ACT II and III. In 2005 and 2006, under the leadership of Kathleen Watson, Senior Associate Dean of Medicine, the Academic Health Center received a grant from the Robert Wood Johnson Foundation to implement a learner centered quality initiative for graduate-level trainees in medicine, nursing, pharmacy and health care administration. This program was designed in collaboration with Fairview Health System.

Implementation began with quality improvement projects as teams work in domains of high priority for the University of Minnesota and the Fairview health care system.

Phillips Neighborhood Clinic. This student-run clinic provides services for the homeless in the Phillips Neighborhood and is affiliated with the Community-University Health Care Clinic clinicians. Over 125 students participate regularly in the experience and

some describe it as the “best experience” during their time as student in the AHC. This activity is entirely voluntary. Students do not receive credit for participation; faculty receive no remuneration, recognition, or incorporation into their typical distribution of effort. The limiting factor for expansion of this clinic is described by students as the inability to recruit faculty. Recently, Travis Olives, MEd, MPH, a first-year medical student, developed a one-credit course with a public health faculty member on “lean management; this course was developed to help students understand administration principles. However, a major barrier to offering the course is the tuition attribution for electives across the schools. Currently no formal structure exists to approve this course for academic credit, to determine whether it meets the criteria for a school elective, or decide whether school resources should and will be utilized, given competing demands.

Based upon the Task Force subcommittee meetings and significant experiences with IPE, the task force recommends the following:

Recommendations:

2. The AHC should invest in the development of exemplary, enduring interprofessional educational programs, beginning with a complete assessment of existing efforts and reasons for their successes. This will require appropriate financial support for interprofessional faculty, faculty development, facilitation of interprofessional scheduling, tuition and fee attribution, and central assistance with development of instructional materials—including but not limited to web-based materials, information technology and support. Desired outcomes of IPE efforts need to include measurable outcomes, such as student attitudes, benchmarks of professionalism, systems-thinking and quality improvement skills. Curricula and teaching materials will need to be refined and developed as well as a complete evaluation and quality assurance system.
3. The AHC should adopt the United Kingdom Centre for the Advancement of Interprofessional Education (CAIPE) definitions of interprofessional education to guide further development of education and practice.

What is Interprofessional Education?

[CAIPE](#) (UK Centre for the Advancement of Interprofessional Education) defines interprofessional education (IPE) as occasions when two or more professions learn from and about each other to improve collaboration and the quality of care. Interprofessional education helps students develop the competencies needed to work together to provide appropriate care to patients, their families and the community: an awareness of the expertise, roles and values of other professions skills and strategies for working on a team, including: recognizing the patient/client and their support systems as central components of the team

- establishing a team decision-making process
- agreeing on shared goals, expectations and responsibility
- recognizing the differences and overlaps in the approach of different disciplines
- building consensus, being flexible and resolving conflicts
- developing communication skills such as attentive listening, good record keeping and a common vocabulary
- learning consultation, collaboration and referral skills

Think of the following types of education as a continuum. Movement along the continuum is characterized by increasingly complex knowledge and appreciation of professions other than one's own. ¹

- **Uniprofessional education (UPE):** Students are all from the same discipline or profession. The mastery of a specific body of knowledge, types of skills and modes of conduct are emphasized.
- **Multiprofessional education (MPE):** Various disciplines are brought together to understand a particular problem or experience. They afford different perspectives on the issue at hand. For example, aging may be conceptualized as a physical or biological process, a psychological process or a set of characteristics.

The World Health Organization (1988) defines MPE as the process by which a group of students from the health-related occupations with different educational backgrounds learn together during certain periods of their education with interaction as an important goal. Its key objectives are the specific team competencies needed to ensure effective team functioning.

- **Interprofessional education (IPE):** Students from various professions learn together as a team. Their collaborative interaction is characterized by the integration and modification of different professions' contributions in light of input from other professions.

The hallmark of IPE is the type of cognitive and behavioural change that occurs: participants understand the core principles and concepts of each contributing discipline and are familiar with the basic language and mindsets of the various disciplines. Prior to participating in IPE, students must have basic knowledge and skills related to their own profession.

These definitions are based on Clark, P.G. (1993), *Journal of Interprofessional Care*, 7(3), p. 219-220.

URL: www.caipe.org.uk

4. Based upon the significant work and experiences of a number of students and faculty, the Task Force recommends adopting the following guidelines in implementing interprofessional education:

- Build upon and protect the signature interprofessional learning experiences of faculty and students in the AHC, much of which currently is outside of formal education
 - Develop a continuum of learner-centered educational programs, courses and activities in which outcomes are patient-, population-, or community-centered
 - Clearly articulate and assess learner outcomes for interprofessional education
 - Offer learner choice to achieve established interprofessional outcomes
 - Fully engage learners in the design of interprofessional education in the AHC.
 - Seek efficiencies and cost-effectiveness in collaboration
 - Meet accreditation standards in the individual schools and programs
 - Design a continuum of classroom, simulated and meaningful experiences in practice settings that add interprofessional value to learning and develops mutual respect, mitigating the “add-on” phenomenon to existing programs
 - Prepare faculty and students prior to IPE activities to achieve success
 - Designate and develop functional teams that can model the behaviors that are to be learned and that provide opportunities for upper level trainees to learn quality improvement methods as part of ongoing interprofessional teams.
 - Transform the AHC for interprofessional education by deploying a top down and a bottom up approach. Develop an academic council consisting of school educational policy council members, faculty, health professionals-in-training, and health care leaders to oversee the implementation and formalize policies and guidelines
 - Formalize faculty assignments for IPE while developing effective faculty rewards and recognition to support faculty work in IPE.
5. Designate an AHC function to serve as the central coordinating entity to manage interprofessional education activities in the AHC. An appropriate name for this function must be used to symbolize interprofessional education (e.g., Center for IPE, Institute for IPE, IPE Program Office).
- Dedicate a website to IPE coordination
 - Conduct assessments and make results public
 - Assign/appoint faculty to engage in scholarship and develop IP expertise
 - Provide faculty education to support IPE delivery
- Create an IPE Academic Council comprised of educational policy committee representatives, faculty and learners to develop IPE policies and guidelines and to serve as the academic standards group for IPE. Prepare policy recommendations for the AHC Executive Education Steering Committee chaired by Dr. Cerra with AHC deans as core members. Fully engage formal consultative groups: AHC Educational Policy Committee/Curriculum Committee Chairs, AHC Faculty Consultative Committee, AHC Student Consultative Committee, and AHC Student Leaders Council (proposed)
 - Appoint the AHC Associate Deans of Education to serve as the academic administrative group with oversight to coordinate interprofessional education.
 - Determine a recognized core set of health professions skills and competencies to be taught to all health professions students. Examples identified include:

- Define a common set of clinical skills that can be taught across the AHC to clinically oriented health professions learners .Work with the Interprofessional Education and Resource Center faculty advisory council that has already identified some of these skills.
- Determine and measure student mastery of understanding and appreciating roles and responsibilities of the health professionals, not just ones own profession.
- Adopt the Institute of Medicine Competencies as a framework: Informatics (80% general; 20% profession-specific), team approach to care, evidence-based practice, health care systems, and patient-centered care
- Consider other cross-professional content areas:
 - Consider core “public health” competencies that must be mastered
 - Communications
 - Ethics
 - Professional health and well-being, Self-care
 - Population health promotion and disease prevention
 - Practitioner development/professional development/professionalism
 - Systems-based practice and teamwork
 - Quality improvement
- Design a continuum or framework for learner outcomes to achieve interprofessional competencies
- Consider forming student teams, learning communities across the AHC from day one.
- Engage AHC student services directors and formalize the role of CHIP to support IPE student competency development
- Develop an Interprofessional Unit (IPU) concept to structure choice, create incentives and award learners credit for approved IPE activities. Recognize current “informal” activities such as CLARION, ACT, and the Phillips Neighborhood for IPUs toward fulfilling required IP education.
- Develop a process to approve required courses and activities that would meet interprofessional criteria
- Coordinate calendars / schedules to facilitate interprofessional / cross-collegiate courses, activities and programs, particularly experiential education. Designate and reserve blocks of time during the week and during the academic and calendar year for IPE activities.
- Create appropriate faculty incentives and recognition to support IPE and the development of interprofessional academic teams
- Create and implement a financial structure to support IPE:
 - Develop strategies to address the impact of tuition attribution on IPE
 - Develop incentive pools for stimulating structured and formal IPE
 - Reward and compensate approved and effective IPE
 - Create incentives through required school education contributions to interprofessional education. This funding can be in the form of in-kind, course offerings, faculty assignments, funding, etc.

- Develop a coordinating function for experiential / clinical education to award recognition for “interprofessional practice” teaching sites, requiring students to participate in a certain number of experiences

The task force believes that it is time to develop the systems to promote true interprofessional collaboration in education, and practice. If we do so, we will have fulfilled the expectations of our health care system partners by preparing the next generation of health professionals. And, we will have fulfilled the vision of the Academic Health Center’s founders.

Compiled by Health Professions Workforce Task Force members – Barbara Brandt, Kathleen Watson, Gwen Halaas, with input from the AHC Associate Deans of Education, multiple faculty and students.

Appendix H: Resource Needs and Funding Sources for Health Professional Education

H.1. Medical Education and Research Costs (MERC)

The state of Minnesota has provided funding for medical professional training since 1998 through the Medical Education and Research Cost Trust Fund (MERC). The purpose of the MERC fund is to compensate hospitals and clinics for a portion of the costs of clinical training. These costs had traditionally been covered by teaching facilities charging higher rates for patient care; however, in a highly competitive market, third party payers had become less willing to pay the higher charges at teaching institutions, leaving teaching facilities at a competitive disadvantage.

The amount of MERC funding has grown from \$17.7 million in 1998 to \$53.5 million in 2005. The University of Minnesota AHC received \$24.2 million in 2005 sponsoring 68 programs and 362 sites of training. There are unique elements to the way in which the federal match is calculated. Sponsoring Institutions, such as the University of Minnesota AHC, apply for funding on behalf of the clinical training sites affiliated with our accredited professional training programs. The University of Minnesota received \$24.2 million in 2005, of which \$21.5 million was directed to our external training partners according to a statutory formula.

Since 1997, the financing for MERC has shifted several times, first to the medical education endowment established by the 1999 legislature with funds from the one-time tobacco settlement, and later to a 2.5 cents per pack cigarette tax, which was shifted to MDH in 2003. Currently, funds for the MERC distribution come from cigarette tax revenues, a temporary transfer of funds from the Academic Health Center, a carveout of medical education funds from the Prepaid Medical Assistance Program/Prepaid General Assistance Medical Care program, and federal Medicaid matching funds obtained by the Department of Human Services.

There are two ongoing activities that could jeopardize the federal matching payments. (1) the US Office of Inspector General is currently auditing the Minnesota Department of Human Services and the MERC match is part of this audit, and (2) the state of Minnesota has proposed a revision to the way the MERC funds are matched and distributed to CMS through a State Plan Amendment. Given that CMS is aggressively reviewing any intergovernmental transfers, the MERC match is being closely scrutinized. There is concern that the PMAP funds including the match be more closely tied to teaching programs that serve a disproportionate share of Medicaid and low-income patients.

Medicare GME

Medicare also plays a significant role in financing Graduate Medical Education at the University of Minnesota. The Direct Medical Education (DME) payments help to cover the costs of resident salaries, faculty salaries and other costs directly generated by the

GME program. The Indirect Medical Education (IME) payments are designed to offset the increased costs associated with the teaching programs are an add-on to the current prospective payment rate per Medicare patient. More recently, Medicare recently added a Children's Hospitals Graduate Medical Education Payment Program (CHGME PP).

The initial IME adjustment has eroded over time with increased scrutiny by the Congress of the role of Medicare in paying higher rates to teaching hospitals. The "Medicare Prescription Drug, Improvement and Modernization Act of 2003" provided additional reductions in the 2004 6.0% increases in IME adjustment to 5.8 percent in FY 2005; and 5.55 percent in FY 2006. However in FY 2007, IME payments are reduced to 5.35 percent and then set at 5.5 percent in FY 2008 and beyond.²⁸⁶

There are also proposals to create an all-payer graduate medical education trust fund which would include Medicare as well as private payers and would save Medicare an estimated \$1.5 billion. There are continued discussions of efforts to spread the burden of financing GME across more payers. Finally, there are concerns with the current caps on residency slots on which DME is calculate which continue to cause concern for AHCs.

There are increased concerns about the Medicare program and the federal government's ability to fund its health care program, including the new drug benefit for a growing elderly population. Financing of medical professional education will be part of ongoing discussions to create a solvent Medicare program into the future.

²⁸⁶ AAMC. GME and IME Payments. <http://www.aamc.org/advocacy/gme/>

**Appendix H: Resource Needs and Funding Sources for
Health Professional Education**

H.2. Selected Health Professions Student Tuition, Debt Load and Starting Salary

School	Average Length of Program (Years)	Estimated Yearly Tuition (In-State) (based on 2005-2006 numbers)	Average Debt Load Upon Graduation for Students who Borrow (2005 Graduates)	Average Starting Salary (Range)
School of Dentistry (D.D.S.)	4 years	\$27,905	\$138,114	\$85,000-\$90,000
Medical School (M.D.)	4 years	\$27,389	\$132,988	\$141,402-\$258,277
School of Nursing (BSN)	3 years	\$7,140	\$20,554	\$52,416-\$53,628
College of Pharmacy (Pharm.D.)	4 years	\$14,374	\$92,697	\$98,363
School of Public Health (MPH)	2 years	\$5,592	\$25,022	\$31,500-\$44,550
College of Veterinary Medicine (D.V.M.)	4 years	\$18,288	\$100,187	\$50,075

Note: All data provided by relevant AHC school.

Appendix H: Resource Needs and Funding Sources for Health Professional Education

H.3. Health Professional Salaries

Dentistry

According to the ADA (2001 data), "Overall non-owner new dentists in the private practice of dentistry averaged \$103,718 in net income from all of their private practices in 2001." However, the University Of Minnesota reports among Minnesota graduates, there is an average of starting salary of \$85,000 - 90,000.

Dental Hygiene

The last class that has been analyzed is 2003. So this information pertains for new grads, and not for those who have been in the profession for a number of years.

Graduates are usually paid by the hour

The starting range of salaries is between \$24-30/ hour; with the highest percentage at \$27/hour

After the first year the range changes slightly (\$27-32/hour), but the highest percentage stayed the same at \$27/hour

If asked about annual gross income, the highest number of graduates report salaries in the range of \$40,000-49,000 for the first year of practice

Medicine

ANESTHESIOLOGY

Compensation ranges from \$258,277 to \$341,407

MGMA \$341,407
 Hay \$320,300
 AMGA \$301,530
 Merritt \$300,000
 HHCS \$291,627
 Sullivan \$258,277
 Warren N/A

EMERGENCY MEDICINE

Compensation ranges from \$167,621 to \$236,000

Merritt \$236,000
 MGMA \$226,561
 AMGA \$219,860
 Hay \$216,100
 Sullivan \$205,140
 HHCS \$167,621
 Warren N/A

FAMILY PRACTICE

Compensation ranges from \$146,000 to \$166,301

MGMA \$166,301
 AMGA \$166,162
 HHCS \$158,413
 Sullivan \$155,658
 Hay \$154,900
 Warren \$151,051
 Merritt \$146,000

GENERAL SURGERY

Compensation ranges from \$232,500 to \$297,208

AMGA \$297,208
 MGMA \$291,684
 Sullivan \$261,341
 Merritt \$248,000
 HHCS \$234,530
 Warren \$232,701
 Hay \$232,500

NEUROLOGY

Compensation ranges from \$169,304 to \$239,000

Hay \$239,000
 MGMA \$219,912
 AMGA \$205,992
 Merritt \$191,000
 HHCS \$182,348
 Warren \$178,403
 Sullivan \$169,304

OBSTETRICS/GYNECOLOGY

Compensation ranges from \$222,625 to \$266,245

AMGA \$266,245
 MGMA \$261,073
 Hay \$252,300
 Merritt \$242,000
 Warren \$237,066
 HHCS \$233,343
 Sullivan \$222,625

PATHOLOGY

Compensation ranges from \$213,693 to \$324,827

MGMA \$324,827
 Hay \$268,800
 AMGA \$256,680
 HHCS \$238,632
 Sullivan \$226,421
 Warren \$213,693
 Merritt N/A

PEDIATRICS

Compensation ranges from \$141,402 to \$172,058

MGMA \$172,058
 AMGA \$166,069
 Hay \$162,400
 Warren \$153,421
 Sullivan \$148,027
 Merritt \$144,000
 HHCS \$141,402

RADIOLOGY

Compensation ranges from \$201,699 to \$412,217

MGMA \$412,217
 AMGA \$360,325
 HHCS \$355,693
 Merritt \$336,000
 Hay \$314,400
 Sullivan \$310,420
 Warren \$201,699

UROLOGY

Compensation ranges from \$251,974 to \$372,543

MGMA \$372,543
 AMGA \$349,394
 Hay \$296,400
 Merritt \$294,000
 HHCS \$289,963
 Sullivan \$269,054
 Warren \$251,974

PSYCHIATRY

Compensation ranges from \$146,878 to \$202,800

AMGA \$174,382

MGMA \$171,998

Hay \$202,800

HHCS \$176,120

Merritt \$164,000

Sullivan \$146,878

Warren N/A

Sources of physician compensation data referenced in this review provided by:

AMERICAN MEDICAL GROUP ASSOCIATION (AMGA)

The Alexandria, VA-based trade group's 18th annual compensation and productivity survey including salary and productivity data from more than 30,000 member medical group physicians in 123 specialties.

HAY GROUP (HAY)

The Philadelphia-based consulting firm surveyed 51 organizations in May 2003, reporting compensation for 9,000 physicians in 102 specialties.

HOSPITAL & HEALTHCARE COMPENSATION SERVICE (HHCS)

The Oakland, NJ-based consulting firm's survey of employed physicians includes 231 organizations and 14,500 physicians in 43 specialties.

MEDICAL GROUP MANAGEMENT ASSOCIATION (MGMA)

The Denver-based trade group's 2004 report based on 2003 data, includes 40,295 physicians in more than 105 specialties surveyed.

SULLIVAN, COTTER & ASSOCIATES

The Detroit-based human resources consulting firm's preliminary 2004 survey reports physician compensation levels paid by more than 175 organizations.

WARREN SURVEYS

The Rockford, IL-based company's report includes 200 participating organizations representing more than 6,000 physician in 32 specialties.

MERRITT, HAWKINS & ASSOCIATES

Merritt, Hawkins & Associates is the nation's leading physician search and consulting firm. Merritt, Hawkins & Associates is part of The MHA Group, an organization of health care staffing firms employing over 650 people in four offices nationwide. Each year,

Merritt, Hawkins & Associates conducts a Review of Physician Recruiting Incentives, examining the salaries, income guarantees and other incentives its clients offer when recruiting physicians. Income data in this compendium is taken from Merritt, Hawkins & Associates' 2004 Review of Physician Recruiting Incentives, which reviews incentives offered in the 2,594 permanent physician search assignments the firm represented from April 1, 2003 to March 31, 2004. Merritt, Hawkins & Associates' data is included each year in *Modern Healthcare's* special physician compensation issue.

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Nursing

HOSPITAL

Position	Hourly	Annual
Clinical Nurse Specialist	\$31.44	\$65,395.20
Nurse Practitioner	\$28.52	\$59,321.60
Care Management, Clinical Nurse Leader	\$34.67	\$72,113.60
RN/BSN	\$25.20	\$52,416.00
HEMOCARE		
RN/BSN	25.78	53,628.00

Pharmacy

An October 2005 survey of 183 (out of 273 respondents of 469 deliverable surveys) active MN pharmacists working at least 30 hours demonstrated MN pharmacist salaries in 2005. Data is separated by area (Twin Cities Metro Area, Small Urban or Rural Area) gender, age, years in practice, degree, and prescription volume. Data below are average numbers overall per hour.

OVERALL

- Region = \$49.54/hr TC Metro, \$48.84/hr Other Urban Area with population >75,000, \$46.18/hr Small Urban or Rural Area
- Gender = \$48.85/hr M & \$47.62/hr F
- Age = \$47.92/hr ≤ 40, \$48.55/hr 41-60, \$49.14/hr >60
- Years in Practice = \$47.29/hr ≤ 10, \$50.65/hr 11-20, \$48/hr > 20
- Degree = \$48.56/hr B.S. & \$47.72/hr Other
- Daily Prescription Volume = \$47.43/hr ≤ 175 & \$48.30/hr >175

Public Health

The salary ranges, as follows, are the actual salaries earned (adjusted for inflation using the national CPI - Bureau of Labor Statistics) within one year of graduation as reported by the most recent nationwide survey of graduates conducted by ASPH:

Biostatistics \$33,000-\$63,000
Epidemiology \$38,175-\$136,237
Health Services Administration \$37,050-\$161,400
Health Education/Behavioral Science \$33,000-\$86,625
Environmental Health \$44,550-\$143,700
International Health \$31,500-\$86,625
Nutrition \$31,500-\$70,875
Public Health Practice/Program Management \$41,175-\$102,000
Biomedical Laboratory \$31,500-\$78,750

Veterinary Medicine

The average salary for veterinary graduates entering private clinical practice for spring 2005 was \$50,075.

Appendix H: Resource Needs and Funding Sources for Health Professional Education

H.4. FY 2005 Instructional Costs and Revenue in the Academic Health Center

prepared by Peter Zetterberg, Office of Institutional Research and Reporting
March, 2006

Introduction

In its periodic instructional cost studies, the Office of Institutional Research and Reporting determines what it costs each University of Minnesota campus and college to educate a full-year equivalent student, sometimes with detail by student level.

This analysis has different objectives, which are:

1. Section 1: to determine how much it cost the University of Minnesota in FY 2005 to produce different kinds of degrees in the health sciences in the Academic Health Center, and
2. Section 2: to identify the primary sources of funding for instruction in each AHC college.

Section 1: Cost per Degree

The cost per degree information is summarized in the first schedule below. The second schedule shows the tuition that students paid, using FY 2005 rates. Note that for students in bachelor's degree and master's degree programs tuition amounts are shown for students graduating in 4-years and 5-years (bachelor's) and 2-years and 3-years (master's), since students proceed through these programs in different ways.

Methodology

The methodology is the same as in standard cost studies for determining how much the University and each of the AHC colleges spends on instruction (both direct costs and indirect costs). But allocating these costs over different kinds of degrees is quite different for several reasons.

1. First, not all of what an AHC college spends on instruction is to produce degrees in the college, especially in Medicine and Public Health, which provide instruction for students in other colleges.
2. Second, undergraduate students in the AHC colleges receive a significant portion of their education in other Twin Cities colleges, most typically CLA.
3. Third, a significant number of undergraduate students in the AHC colleges entered the University as transfer students, so part of the cost of educating them was incurred elsewhere. Transfer students typically account for about 50 percent

of the new undergraduate students in Medicine and Dentistry and about 30 percent in Nursing. These transfer students usually need to complete coursework in another Twin Cities college, although not as much as a student matriculating as a new freshman.

1. Academic Health Center FY 2005 Cost per Degree			
College/School	Degree	# Degrees	Cost per Degree
Medical School	Bachelor's	41	\$124,075
School of Dentistry	Bachelor's	37	\$103,136
School of Nursing	Bachelor's	111	\$97,342
Medical School	Master's	30	\$106,240
School of Dentistry	Master's	13	\$84,208
School of Public Health	Master's	158	\$58,350
School of Nursing	Master's	92	\$47,282
College of Veterinary Medicine	Master's	10	\$43,213
College of Pharmacy	Master's	2	\$39,732
Medical School	Ph.D.	39	\$133,769
School of Public Health	Ph.D.	24	\$114,676
School of Nursing	Ph.D.	11	\$101,481
College of Veterinary Medicine	Ph.D.	7	\$81,288
College of Pharmacy	Ph.D.	12	\$73,236
Medical School	D.P.T.	33	\$227,294
Medical School	M.D.	222	\$348,276
School of Dentistry	D.D.S.	86	\$272,239
College of Veterinary Medicine	D.V.M.	76	\$209,988
College of Pharmacy	D.Pharm.	132	\$129,344

2. Academic Health Center FY 2005 Tuition per Degree (Student Cost)					
		Resident	Nonresident	Resident	Nonresident
		4-Year	4-Year	5-year	5-year
Medical School	Bachelor's	\$33,112	\$79,632	\$41,390	\$99,540
School of Dentistry	Bachelor's	\$33,112	\$79,632	\$41,390	\$99,540
School of Nursing	Bachelor's	\$33,112	\$79,632	\$41,390	\$99,540
		Resident	Nonresident	Resident	Nonresident
		2-Year	2-Year	3-Year	3-Year
Medical School	Master's	\$22,748	\$36,948	\$29,322	\$50,622
School of Dentistry	Master's	\$22,748	\$36,948	\$29,322	\$50,622
School of Public Health	Master's	\$22,185	\$38,964	(no band; based crs per deg)	
School of Nursing	Master's	\$22,748	\$36,948	\$29,322	\$50,622
College of Veterinary Medicine	Master's	\$22,748	\$36,948	\$29,322	\$50,622
College of Pharmacy	Master's	\$22,748	\$36,948	\$29,322	\$50,622
		Resident	Nonresident		
		4-Year	4-Year		
Medical School	Ph.D.	\$39,096	\$67,496		
School of Public Health	Ph.D.	\$39,096	\$67,496		
School of Nursing	Ph.D.	\$39,096	\$67,496		
College of Veterinary Medicine	Ph.D.	\$39,096	\$67,496		
College of Pharmacy	Ph.D.	\$39,096	\$67,496		
		Resident	Nonresident		
		3-Year	3-Year		
Medical School	D.P.T.	\$50,463	\$87,228		
		Resident	Nonresident		
		4-Year	4-Year		
Medical School	M.D.	\$91,216	\$131,379		
School of Dentistry	D.D.S.	\$79,400	\$127,520		
College of Veterinary Medicine	D.V.M.	\$69,560	\$132,720		
College of Pharmacy	D.Pharm.	\$60,032	\$105,584		

4. Fourth, to determine the cost of producing an M.D. graduate it is necessary to include costs for the Duluth Medical School, where some of each year's graduates received the first two years of their education.
5. Fifth, medical residents (or medical fellow specialists) generate almost exactly the same number of student credit hours as M.D. students, but it is not at all clear that it costs the same to train them or where those costs are incurred (i.e., inside the University or outside the University).

The costs of the major degree programs in the AHC are presented in the schedules for each college that follow the narrative. For ease of reference the schedules are organized in exactly the same way in terms of rows and columns (e.g., cell F7 always shows the cost of awarding a master's degree). The rows are blank in cases where a college does not offer a degree at a certain level (e.g., Public Health does not award a bachelor's degree).

Each schedule is divided into four parts.

Part 1 shows the direct, indirect, and total instructional costs for each college, the student credit hours taught, and the cost per credit hour. Note importantly that these are the total costs to the University, not just the cost to each college. The direct costs are the costs in each college and the indirect costs are other costs that the University incurs for facilities, libraries, administrative services, and so forth. The detail in Part 1 was developed by my colleague Sarah Delaney, who is doing a detailed cost study for FY 2003. This cost study determines how much it costs the University for each of the three mission activities: instruction, research, and public service. I have made minor adjustments to Sarah's instructional cost numbers based on changes in expenditure patterns between FY 2003 and FY 2005.

Part 2 shows detail for the cost of degrees in each college. The methodology is simple and straightforward. The cells in column D and E show, respectively, the average number of total credits completed by graduates in FY 2005 and the number of those total credits that were completed in each AHC college. For the graduate and first professional degrees the numbers in columns D and E are always the same. The numbers for the bachelor's degrees in columns D and E are different, reflecting the fact that students complete credits in another Twin Cities college or another institution before transferring to a college in the AHC. For the schools and colleges awarding bachelor's degrees, row 5 is an actual figure based on the number of degrees awarded in FY 2005 and the credit pattern of the students (e.g., number of transfer credits) and row 6 is a modeled figure for a prototypical undergraduate student matriculating as a freshman and graduating with a minimum number of credits.

The cost for each degree is the average number of credits completed by graduates in each program multiplied by the credit hour cost for the college. For bachelor's degrees the cost is the average number of credits completed in the AHC college by graduates in each program multiplied by the credit hour cost for the college plus the average number of credits completed in another college multiplied by an average per credit figure for CLA, IT, and CBS of \$450.

Note in the Medical School schedule that row 10 shows an adjustment for the Duluth School of Medicine and that row 11 shows the adjusted cost of producing an M.D. degree at the University.

A much more sophisticated analysis might attempt to differentiate costs by degree level, on the assumption that it might cost less to produce a credit hour at that undergraduate level than at the Ph.D. or first professional levels. For example, instruction at the undergraduate level might be provided by instructors with lower salaries, on average, than instructors at other levels. This is definitely true in college such as CLA and IT, where teaching assistants play a significant role in providing instruction, especially at the lower division level. It is probably less true in the AHC undergraduate programs, where nearly all of the instruction is at the upper division level. It is probably not the case, for example, that the instructors of undergraduate students have lower salaries than the instructors of graduate students since most faculty members teach both kinds of students. In any event, in this study no adjustment has been made to differentiate costs by degree level.

Part 3 provides detail for the instruction that AHC colleges provide for other University students (row 15) and for other unidentified instructional costs (row 16). Note that the amount in row 16 for Nursing is negative and that the amount in row 16 for Dentistry is very small. This is because these are the two AHC colleges that are net importers of instruction -- that is students in these colleges take more credits than the college teaches.

The most interesting number in part 3 is for the Medical School, where the amount shown for other instructional costs in row 15 is more than \$45 million dollars. This is probably a reasonable estimate of what it costs the University to train medical residents. For example, the salaries of medical residents, which are usually coded as instruction, totaled more than \$38 million in FY 2005. I confess, however, that I know little about all of the costs associated with the training of medical residents and the various parties that incur these costs (e.g., the University, affiliated community sites, etc.).

Part 4 provides a total for the amounts shown in column G. Note that this is the same amount as in cell E2.

Section 2: Sources of Funding for Instruction

The figures at the end of the report show the sources of funding for instructional costs in each AHC college in FY 2005. Note that these are just the instructional costs within each college. They do not include the University's indirect support.

Methodology

The Office of Budget and Finance maintains "fiscal pages" for each University college and department (see URL below), and these are the source of the data used for this analysis.

<http://www.budget.umn.edu/budget/fy06/>

The fiscal pages for each college are provided in an Excel workbook that has a summary worksheet that provides detail for each non-sponsored fund used by the college and also separate worksheets for each fund. The worksheet for each fund provides expenditure information by function (e.g., instruction, research, public service, academic support, etc.). For this analysis I used an adjusted instruction figure for each fund by allocating the support functions (e.g., academic support, student support, etc.) to instruction based on instruction as a percentage of the three mission activities (e.g., instruction, research, and public service). The result is always a number that is somewhat higher than just instruction.

Since expenditures from General Operations and Maintenance funds (GOM—fund 1003) include both state dollars and tuition and fee revenue, I used the tuition attribution reports for each college to divided the O&M total into these two pieces.

Fund Source Key

- DENTISTRY-CLINICAL UNREST - TDEN
- ENDOWMENT TARGET - TMED2, TNUR, TPHR, TVET
- INDIRECT COST RECOVERY - TPUB
- NS/INDIVIDUALS & OTHERS - DMED, TDEN, TMED, TPHR
- NS/MN MEDICAL FOUNDATION - TPUB
- NS/U OF M PHYSICIANS - TMED, TMED2
- NS/U OF MN FOUNDATION - TNUR, TPUB, TVET
- OTHER - DMED, TDEN, TMED, TMED2, TNUR, TPHR, TPUB, TVET
- OTHER UNRESTRICTED - DMED, TDEN, TMED, TMED2, TNUR, TPHR, TPUB, TVET
- STATE O&M - DMED, TDEN, TMED, TMED2, TNUR, TPHR, TPUB, TVET
- STATE SPEC-HEALTH SCI - DMED, TDEN
- STATE SPEC-MN CARE - DMED
- STATE SPEC-TOBACCO - TMED, TMED2, TNUR, TPHR
- TUITION AND FEES - DMED, TDEN, TMED, TMED2, TNUR, TPHR, TPUB, TVET
- VETERINARY TEACHING HOSP - TVET

The figures at the end of this report show the top 6 fund sources for instruction in each college, with other fund sources lumped together as "Other." All of the colleges use a total of 14 fund sources, but only have 3 in common. Six of the fund sources are unique to just one college. The 14 fund sources are listed in the figure above, which provides a key to the color used for each fund source in the figures (e.g., State O&M is green in each figure). The key above also indicates which colleges rely most heavily on each fund source.

There are two figures for the Medical School (TMED and TMED2 in the key). The first figure (TMED) was calculated in exactly the same way as for the other AHC colleges. As shown, the largest single source of funding for instruction in the Medical School is "Non-sponsored/ Individuals and Others" (fund 1859), which accounts for about 36 percent of instructional expenditures and which makes funding for instruction in the Medical School appear to be very different than in the other AHC colleges. However, what accounts for the difference is that nearly all of the funding for fund 1859 comes from resident contracts with the affiliated hospitals (\$48.6 million). Note that the \$48.6 million for resident contracts corresponds closely to the \$45 million in other instructional costs in the Medical School schedule that I attributed above to the cost of residents (see cell G15).

In the second figure for the Medical School (TMED2) I have removed the medical resident contracts to produce a figure that better depicts the funding pattern for other kinds of students in the Medical School (e.g., undergraduate students, graduate students, and M.D. students).

As the figures show, there is considerable variation in how instruction is funded in the AHC colleges, with Nursing and Pharmacy relying on tuition and fees for more than half of the cost, while the Duluth Medical School relies on state funds for more than 60 percent and Veterinary Medicine relies quite heavily on revenue from the Veterinary Teaching Hospital.

Finally, it should be noted that this analysis is incomplete in that it includes only non-sponsored funds. In FY 2005 the AHC colleges also had sponsored expenditures of \$37.1 million for training and public service. More than \$30.4 million of this total was in the Medical School and the School of Public Health. Although some of this funding was surely classified by function as instruction, most would have been classified as public service.

Medical School						
A	B	C	D	E	F	G
1	Part 1	Direct Cost	Indirect Cost	Total Cost	Credit Hours	Cost per Credit Hour
2	Cost Detail	\$90,165,731	\$60,924,462	\$151,090,192	93,768	\$1,611
3						
4	Part 2	Degrees Awarded	Credits per Degree at UofM	Credits per Degree in Medicine	Cost per Degree	Total Cost
5	Bachelor: Actual	41	95	70	\$124,075	\$5,087,087
6	Bachelor: Model	41	120	70	\$135,292	
7	Master's	30	66	66	\$106,240	\$3,187,190
8	Ph.D.	39	83	83	\$133,769	\$5,217,001
9	M.D.	222	188	188	\$303,334	\$67,340,258
10	UMD Adj				\$44,941	
11	M.D. Adj				\$348,276	
12	D.P.T	33	141	141	\$227,294	\$7,500,692
13	Part 3				Credit Hours	Total Cost
14	Cost for Instruction of Students in Other Colleges				10,886	\$17,540,822
15	Other Instructional Costs					\$45,217,143
16						
17	Part 4: Total					\$151,090,192

School of Nursing						
A	B	C	D	E	F	G
1	Part 1	Direct Cost	Indirect Cost	Total Cost	Credit Hours	Cost per Credit Hour
2	Cost Detail	\$6,862,131	\$8,063,040	\$14,925,172	15,416	\$968
3						
4	Part 2	Degrees Awarded	Credits per Degree at U of M	Credits per Degree in Nursing	Cost per Degree	Total Cost
5	Bachelor's: Actual	111	130	75	\$97,342	\$10,804,941
6	Bachelor's: Model	111	120	75	\$92,862	
7	Master's	92	49	49	\$47,282	\$4,349,948
8	Ph.D.	11	105	105	\$101,481	\$1,116,290
9						
10						
11						
12						
13	Part 3				Credit Hours	Total Cost
14	Other Instruction				Credit Hours	Total Cost
15	Cost for Instruction of Students in Other Colleges					
16	Other Instructional Costs					-\$1,346,007
17	Part 4: Total					\$14,925,172

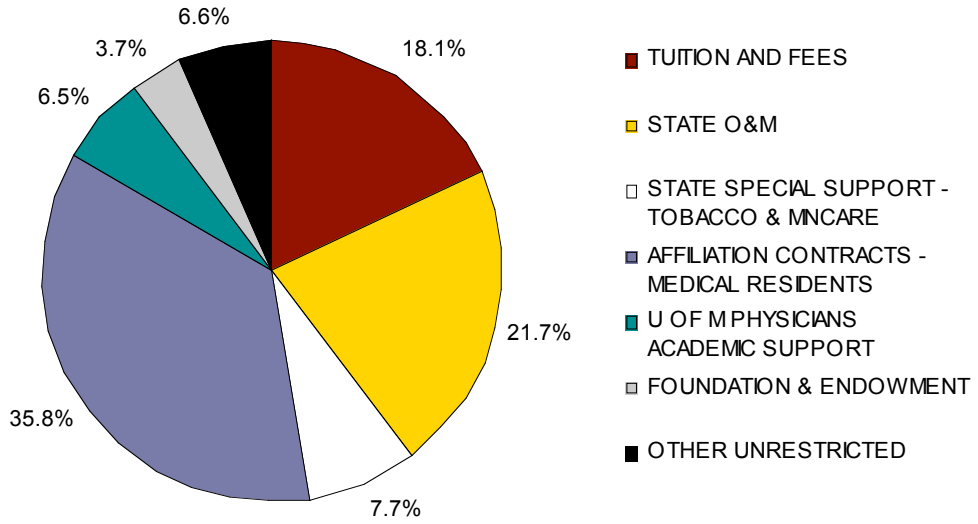
School of Dentistry						
A	B	C	D	E	F	G
1	Part 1	Direct Cost	Indirect Cost	Total Cost	Credit Hours	Cost per Credit Hour
2	Cost Detail	\$14,034,402	\$14,351,584	\$28,385,986	26,734	\$1,062
3						
4	Part 2	Degrees Awarded	Credits per Degree at U of M	Credits per Degree in Dentistry	Cost per Degree	Total Cost
5	Bachelor's: Actual	37	112	86	\$103,136	\$3,816,027
6	Bachelor's: Model	37	130	86	\$111,114	
7	Master's	13	79	79	\$84,208	\$1,094,709
8						
9	D.D.S.	86	256	256	\$272,239	\$23,412,546
10						
11						
12						
13	Part 3				Credit Hours	Total Cost
14	Cost for Instruction of Students in Other Colleges					
15	Other Instructional Costs					\$62,705
16						
17	Part 4: Total					28,385,986

College of Pharmacy						
A	B	C	D	E	F	G
1	Part 1	Direct Cost	Indirect Cost	Total Cost	Credit Hours	Cost per Credit Hour
2	Cost Detail	\$11,422,731	\$11,764,679	\$23,187,410	24,511	\$946
3						
4	Part 2	Degrees Awarded	Credits per Degree at U of M	Credits per Degree in Pharmacy	Cost per Degree	Total Cost
5						
6						
7	Master's	2	42	42	\$39,732	\$79,464
8	Ph.D.	12	77	77	\$73,236	\$878,834
9	D.Pharm.	132	137	137	\$129,344	\$17,073,411
10						
11						
12						
13	Part 3				Credit Hours	Total Cost
14	Cost for Instruction of Students in Other Colleges				2,809	\$2,656,841
15	Other Instructional Costs					\$2,498,859
16						
17	Part 4: Total					\$23,187,410

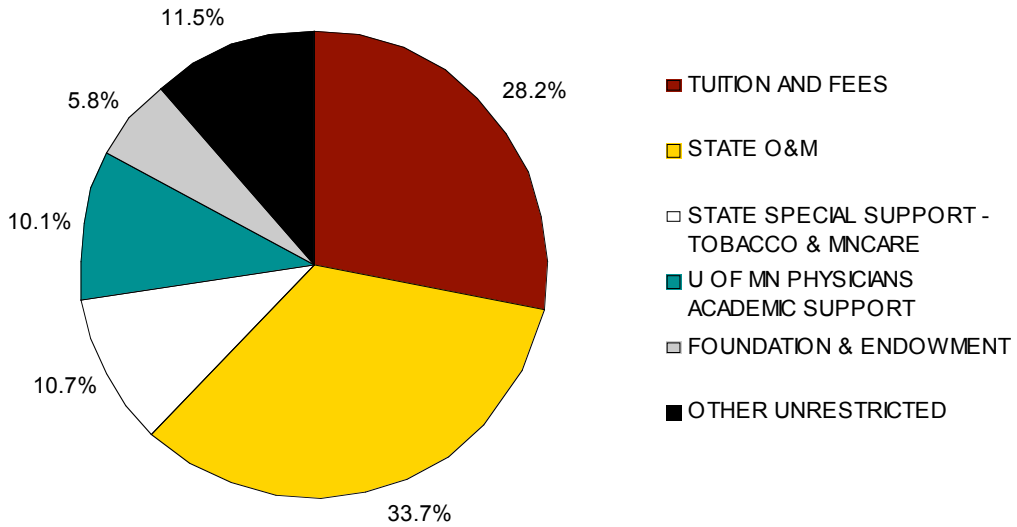
School of Public Health						
A	B	C	D	E	F	G
1	Part 1	Direct Cost	Indirect Cost	Total Cost	Credit Hours	Cost per Credit Hour
2	Cost Detail	\$10,623,285	\$7,831,570	\$18,454,855	16,026	\$1,152
3						
4	Part 2	Degrees Awarded	Credits per Degree at U of M	Credits per Degree in Public Health	Cost per Degree	Total Cost
5						
6						
7	Master's	158	51	51	\$58,350	\$9,219,367
8	Ph.D.	24	100	100	\$114,676	\$2,752,222
9						
10						
11						
12						
13	Part 3				Credit Hours	Total Cost
14	Cost for Instruction of Students in Other Colleges				4,365	\$5,025,971
15	Other Instructional Costs					\$1,457,296
16						
17	Part 4: Total					\$18,454,855

College of Veterinary Medicine						
A	B	C	D	E	F	G
1	Part 1	Direct Cost	Indirect Cost	Total Cost	Credit Hours	Cost per Credit Hour
2	Cost Detail	\$12,410,917	\$9,150,521	\$21,561,438	21,106	\$1,022
3						
4	Part 2	Degrees Awarded	Credits per Degree at U of M	Credits per Degree in Vet Med	Cost per Degree	Total Cost
5	Bachelor's: Actual	18		84	\$86,040	\$1,548,713
6	Bachelor's: Model	18				
7	Master's	10	42	42	\$43,213	\$432,128
8	Ph.D.	7	80	80	\$81,288	\$569,019
9	D.V.M.	76	206	206	\$209,988	\$15,959,101
10						
11						
12						
13	Part 3				Credit Hours	Total Cost
14	Cost for Instruction of Students in Other Colleges				1,747	\$1,784,187
15	Other Instructional Costs					\$1,268,290
16						
17	Part 4: Total					\$21,561,438

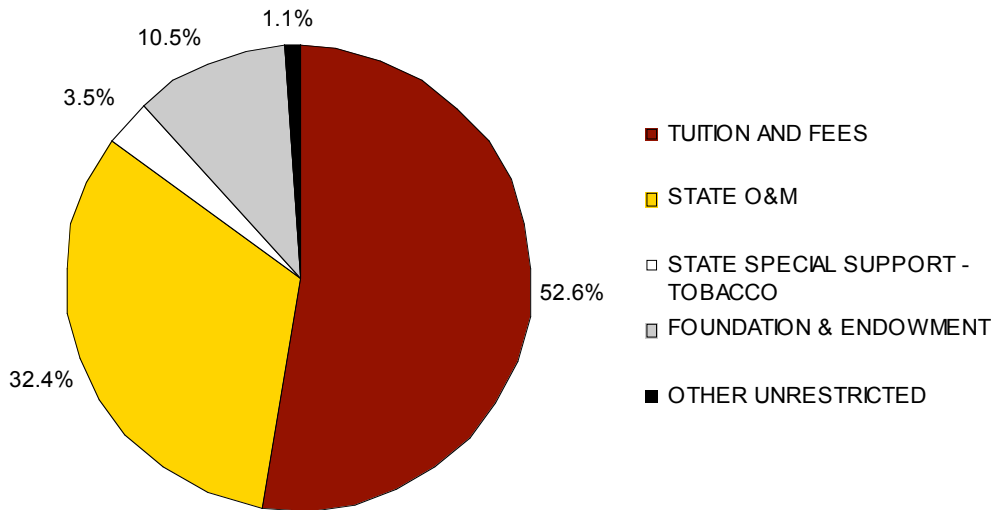
**MEDICAL SCHOOL SOURCES OF FUNDING
for Instructional Costs of \$151,090,192 (FY05)**



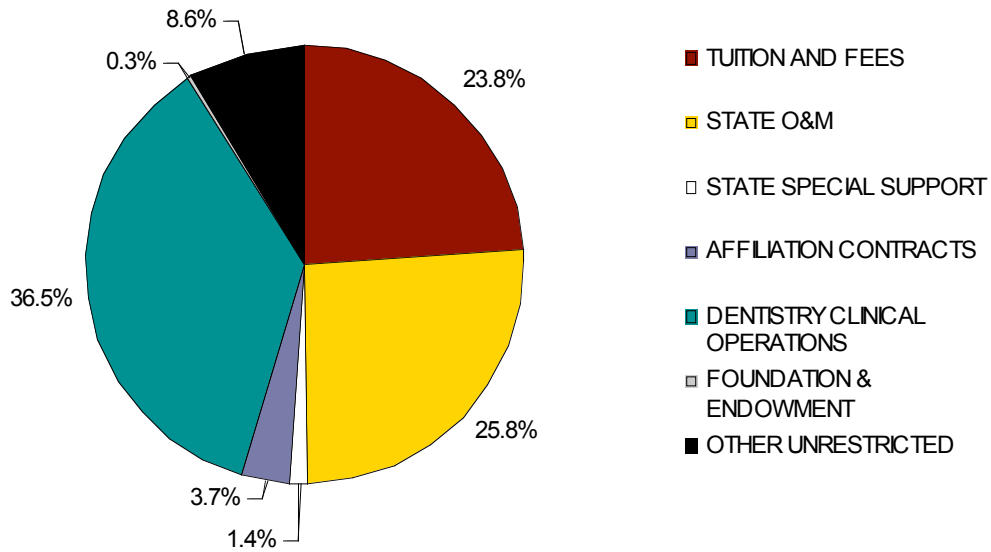
**MEDICAL SCHOOL without RESIDENT CONTRACTS
SOURCES OF FUNDING
for Instructional Costs of \$105,873,049 (FY05)**



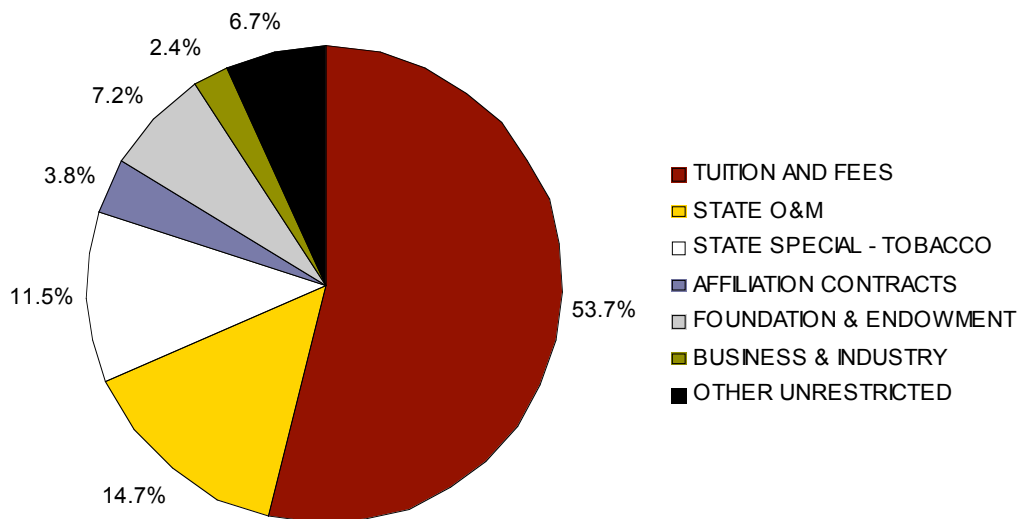
**SCHOOL OF NURSING SOURCES OF FUNDING
for Instructional Costs of \$14,925,172 (FY05)**



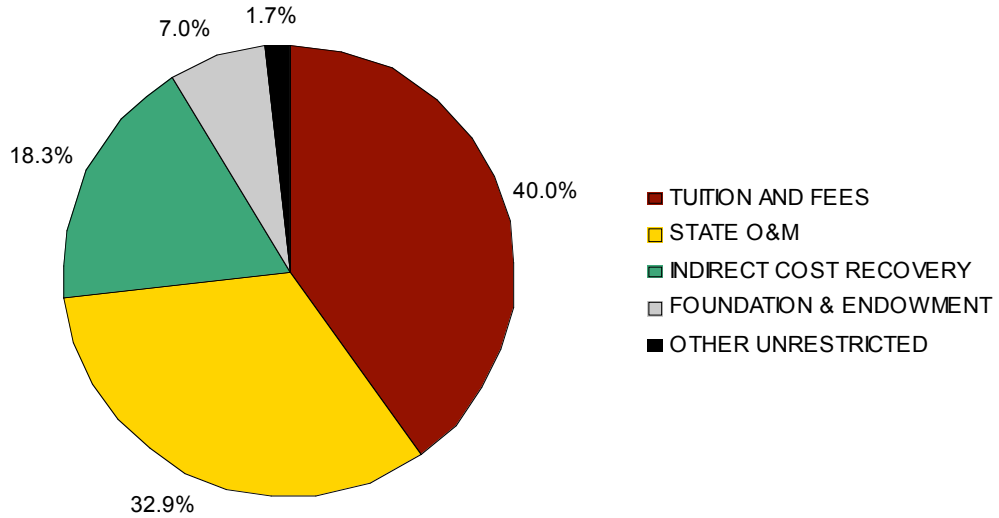
**SCHOOL OF DENTISTRY SOURCES OF FUNDING
for Instructional Costs of \$28,385,986 (FY05)**



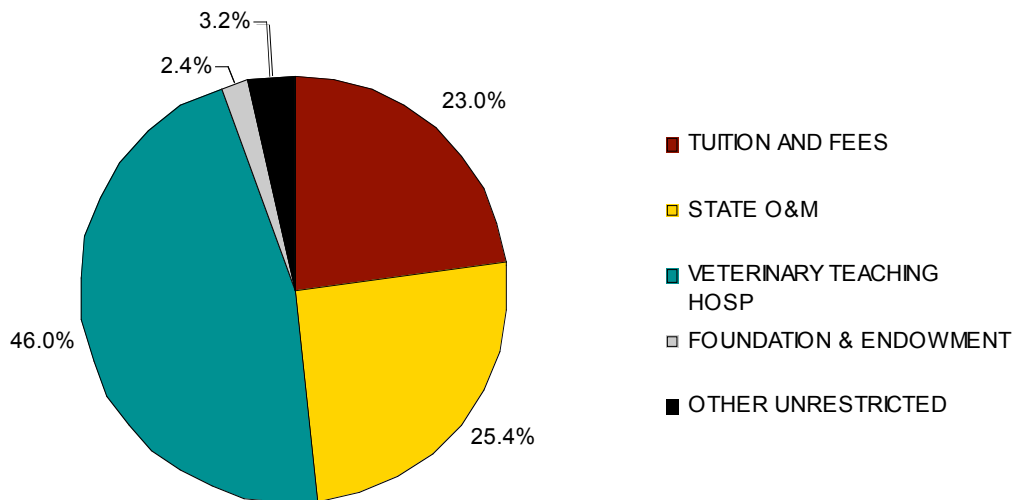
**COLLEGE OF PHARMACY SOURCES OF FUNDING
for Instructional Costs of \$23,187,410 (FY05)**



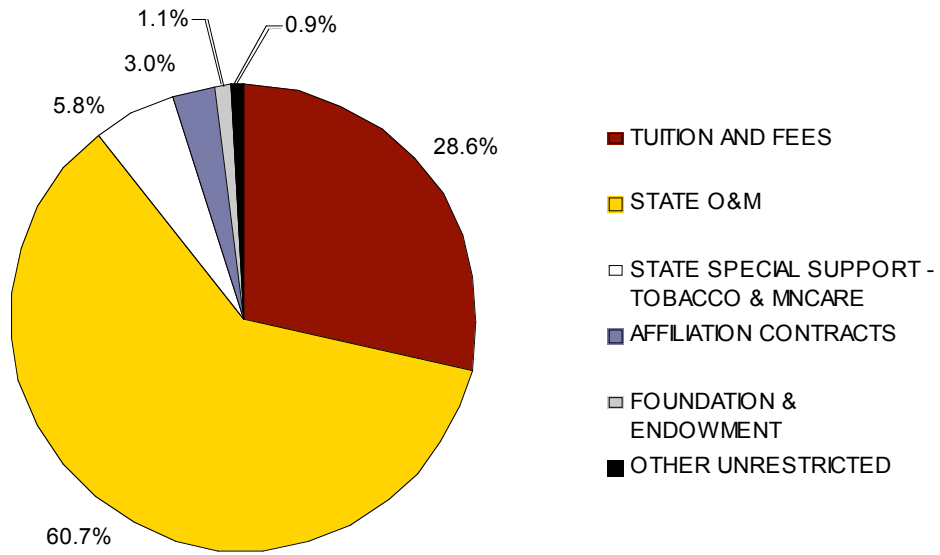
**SCHOOL OF PUBLIC HEALTH SOURCES OF FUNDING
for Instructional Costs of \$18,454,855 (FY05)**



**COLLEGE OF VETERINARY MEDICINE SOURCES OF FUNDING
for Instructional Costs of \$21,561,438 (FY05)**



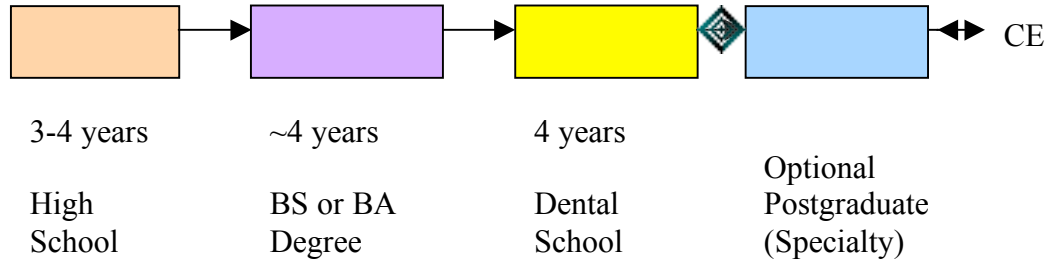
DULUTH MEDICAL SCHOOL SOURCES OF FUNDING
for Instructional Costs of \$9,976,902 (FY05)



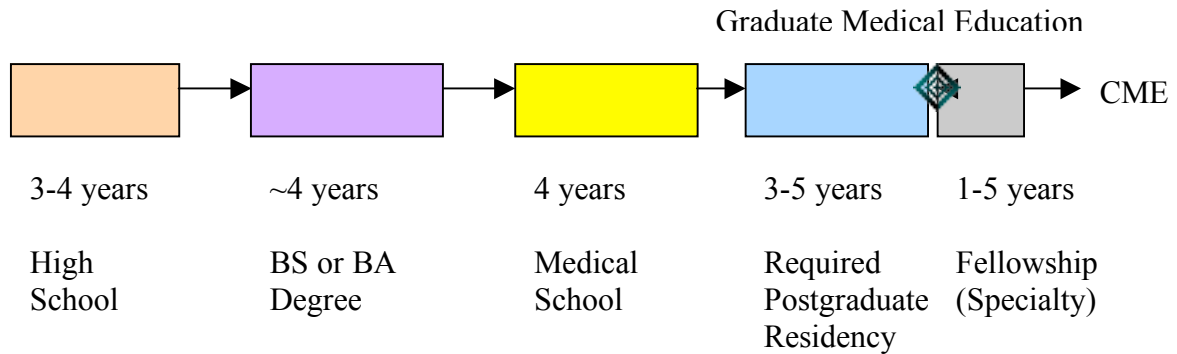
Appendix H: Resource Needs and Funding Sources for Health Professional Education

H.5. Pathways to Health Professions Practice

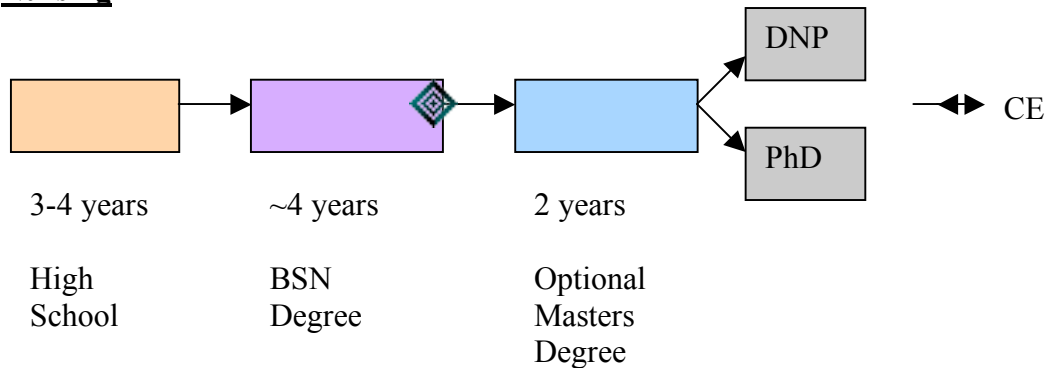
Dentistry (D.D.S.)



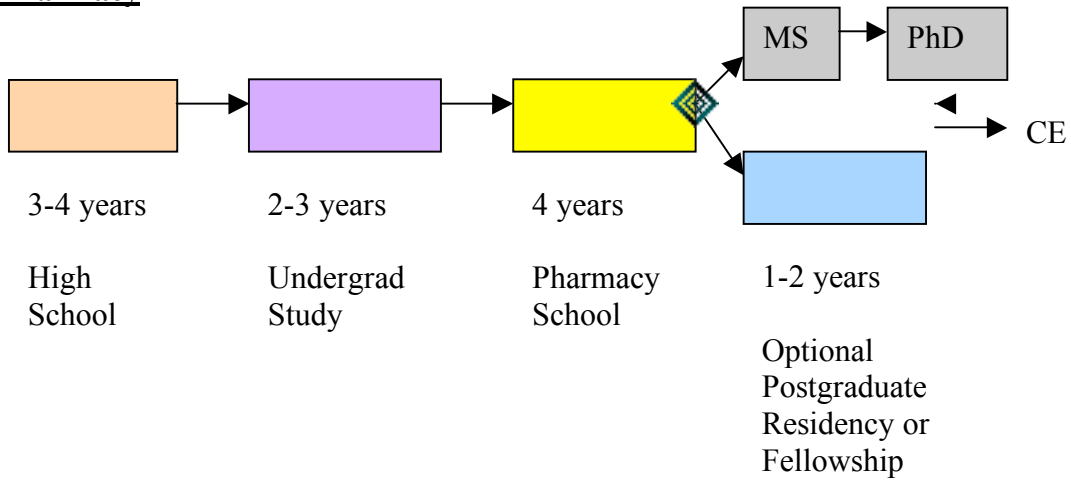
Medicine (M.D.)



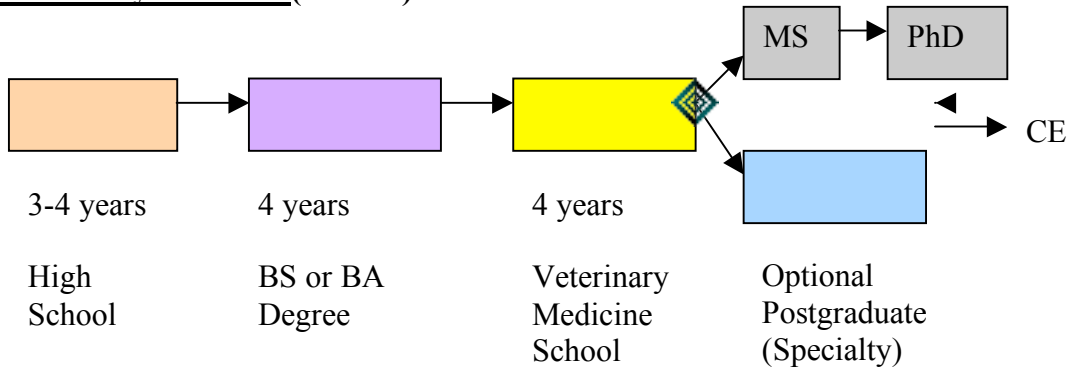
Nursing



Pharmacy



Veterinary Medicine (V.M.D.)



Endnotes

ⁱ Institute of Medicine. 2003. *Health Professions Education: A Bridge to Quality*. Ann C. Greiner and Elisa Knebel, (Eds). Washington, D.C.: The National Academies Press.

ⁱⁱ Barr, H., Koppel, I, Reeves, S, Hammick, M., and Freeth, D. *Effective Interprofessional Education: Argument, Assumption and Evidence*. Oxford, UK: Blackwell Press, 2005.

ⁱⁱⁱ Freeth, D., Hammick, M, Reeves, S, Koppel, I, and Barr, H. *Effective Interprofessional Education: Development, Delivery and Evaluation*. Oxford, UK: Blackwell Press, 2005.

^{iv} Institute for Healthcare Improvement,
<http://www.ihl.org/IHI/Topics/HealthProfessionsEducation/>

^{vi} Cheri Perlmutter, Personal Communication, 2001.

^{vii} University of Minnesota Academic Health Center, *A Look Back and A Look Ahead*, 1990.

^{viii} Brandt, BF and Cerra, FB *Building a Sustainable Environment for Interprofessional Education Within the University of Minnesota Academic Health Center*. Washington DC: Association of Academic Health Centers, 2004.

^{ix} Thommes, Terri. *Stimulating and Funding Interprofessional Education at the University of Minnesota Academic Health Center*, Report to Barbara Brandt, Assistant Vice President for Education and Elizabeth Nunnally, Associate Vice President for Finance, January 2004.

^x Joint Council on the Accreditation of Healthcare Organizations, 2006

^{xi}: AW Johns, SJ Potthoff, L Carranza, HM Swenson, CR Platt, and JR Rathbun. A Novel Interprofessional Approach to Health Care Education. *Acad. Med.* 2006;81(3):252-256. CLARION

**University of Minnesota Workforce Taskforce
Workforce Data for the University of Minnesota School of Dentistry**

General Information														
Vision														
The University of Minnesota School of Dentistry sets the standard for the rest of the world.														
Mission														
The University of Minnesota School of Dentistry improves oral and craniofacial health by educating clinicians and scientists who translate knowledge and experience into clinical practice. The School is committed to: graduating professionals who provide the highest quality care and service to the people of the state of Minnesota and the world; discovering new knowledge through research, which will inspire innovation in the biomedical, behavioral and clinical sciences; and providing oral health care to a diverse patient population in a variety of settings.														
Primary Focus of Educational Offerings														
Primarily Minnesota since only school in state and one of 56 in country; the only dental hygiene program in Minnesota that grants a baccalaureate degree and is affiliated with a school of dentistry.														
Secondary Focus of Educational Offerings														
Commission on Dental Accreditation														
Professional Associations and Resources Utilized for Workforce Data														
National and State Financial Incentives														
National Health Service Corps Loan Repayment Program														
Degree Programs/Student Statistics														
Degree Program	Program Length	Number of Students	Number of Clinical Hours	In State Tuition	Out-of-State Tuition	Average Debt Load								
Bachelor's Degree (B.S.)	2 years	24	942 (30-40/week)	\$274.62/credit (thru 12 credits)	\$721.92/credit (thru 12 credits)	\$25,807								
Doctorate Degree (D.D.S.)	4 years	97	1900	\$27,905 year 1; \$33,416 year 2; \$38,863 year 3; \$31,065 year 4 + \$3,072.26/fees/year	\$40,809 year 1; \$49,771 year 2; \$50,238 year 3; \$47,420 year 4	\$ 138, 114								
Student Data (2005-2003)														
Admissions Data														
	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	2003	
													Number Enrolled From Acceptance	Number Enrolled From Acceptance
Bachelor's Degree (B.S.)	124	76	24	92%	White-20, Other-4	1M: 23F	89	58	26	34	71%	White-20, Other-5	1M: 33F	36
Doctorate Degree (D.D.S.)	761	120	97	67%	11 Minority	51M: 46F	646	133	97	65%	11 Minority	50M: 47F	97	
Student Data (2002-2000)														
Admissions Data														
	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	2001	
													Number Enrolled From Acceptance	Number Enrolled From Acceptance
Bachelor's Degree (B.S.)	70	52	36	86%	White-20, Other-6	1M: 35F	62	42	36	34	83%	White-20, Other-5	1M: 33F	36
Doctorate Degree (D.D.S.)	604	134	91	61.50%	5 Minority	50M: 41F	637	138	85	86	63%	10 Minority	47M: 39F	85
Graduate Data (2005-2003)														
	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	2003	
													Number of graduates	Number of graduates
Bachelor's Degree (B.S.)			33						29				31	
Doctorate Degree (D.D.S.)			97						100				85	
Graduate Data (2002-2000)														
	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	2002	
													Number of graduates	Number of graduates
Bachelor's Degree (B.S.)			31						34				33	
Doctorate Degree (D.D.S.)			87						81			37%	77	
Doctorate Degree (D.D.S.)														32%

**University of Minnesota Workforce Taskforce
Workforce Data for the School of Medicine**

General Information		The mission will be accomplished by matriculating a diverse and accomplished student body into outstanding, forward-looking, and integrated educational programs at the University and community, which stimulate students to excel. These programs, implemented by preminent educators in state-of-the-art facilities, will prepare future primary care providers, clinical subspecialists, researchers, educators and health care leaders. Graduates will be caring physicians who demonstrate mastery of the foundations of medicine by their: knowledge of basic and clinical sciences, ethics, humanities pertinent to medicine, and the social and community dimensions of health, skill in patient care and problem solving acceptance of responsibility for improving the evidence-based practice of medicine, commitment to lifelong learning															
Vision		The mission of the Medical School is to be a leader in enhancing the health of people through the education of skilled, compassionate and socially responsible physicians and through research which advances the understanding of health and disease. With two campuses serving diverse populations in rural and urban Minnesota the Medical School is dedicated to exemplary primary, and specialty care, innovative research and education															
Description of Service Area																	
Primary Focus of Educational Offerings																	
Secondary Focus of Educational Offerings																	
Accreditation Agency		Accreditation Council for Graduate Medical Education (ACGME), American Board of Obstetrics and Gynecology (ABOG), American Association for Pediatric Ophthalmology & Strabismus (AAPOS), American Society of Transplant Surgeons (ASTS)															
Professional Associations and Resources Utilized for Workforce Data																	
National and State Financial Incentives		Indian Health Service Loan Repayment Program, Minnesota Rural Physician Loan Forgiveness Program, Minnesota State Loan Repayment Program, Wisconsin Physician Loan Assistance Program, National Health Service Corps															
Degree Programs/Student & Resident Statistics																	
Degree Program		Program Length	Number of students	Number of Clinical Hours	In State Tuition	Out-of-State Tuition	Average Debt Load										
Doctorate Degree		4 years	165	4500	\$18,320 + \$9,069 Summer year 1; \$17,804 + \$8,811 Summer year 2; \$13,252 + \$6,534 Summer year 3; \$13,252 + \$6,535 Summer year 4	\$22,916 + \$11,367 Summer year 1; \$22,400 + \$11,109 Summer year 2; \$23,800 + \$11,809 Summer year 3; \$23,800 + \$11,809 Summer year 4	\$132,988										
Post M.D. Residency		4 years	16	Not Asked	Not Asked	Not Asked	Not Asked										
Anesthesiology		1 year transition + 3 years Dermatology	16	Not Asked	Not Asked	Not Asked	Not Asked										
Dermatology		3 years	33	Not Asked	Not Asked	Not Asked	Not Asked										
Emergency Medicine - HC/MC		3 years	27	Not Asked	Not Asked	Not Asked	Not Asked										
Emergency Medicine - Regions		3 years	130	Not Asked	Not Asked	Not Asked	Not Asked										
Family Medicine & Community Health		4 years	26	Not Asked	Not Asked	Not Asked	Not Asked										
Laboratory Medicine & Pathology		4 years	17	Not Asked	Not Asked	Not Asked	Not Asked										
Neurology		6 years	9	Not Asked	Not Asked	Not Asked	Not Asked										
Neurosurgery		4 years	40	Not Asked	Not Asked	Not Asked	Not Asked										
Obstetrics, Gynecology & Women's Health		3 years	12	Not Asked	Not Asked	Not Asked	Not Asked										
Ophthalmology		5 years	34	Not Asked	Not Asked	Not Asked	Not Asked										
Orthopaedic Surgery		5 years	20	Not Asked	Not Asked	Not Asked	Not Asked										
Otolaryngology		3 years	73	Not Asked	Not Asked	Not Asked	Not Asked										
Pediatrics		4 years	12	Not Asked	Not Asked	Not Asked	Not Asked										
Physical Medicine & Rehabilitation		4 years	22.5	Not Asked	Not Asked	Not Asked	Not Asked										
Psychiatry		5 years	50	Not Asked	Not Asked	Not Asked	Not Asked										
Radiology		5 clinical, 2-4 research years	44	Not Asked	Not Asked	Not Asked	Not Asked										
Surgery		4 years	16	Not Asked	Not Asked	Not Asked	Not Asked										
Therapeutic Radiology		5 years	10	Not Asked	Not Asked	Not Asked	Not Asked										
Urologic Surgery																	
Student & Resident Data (2005-2003)																	
Admissions Data																	
		2005	2004	2003													
		Number of Applicants	Number of Qualified Applicants	Number of Students Accepted	Number of Applicants	Number of Qualified Applicants	Number of Students Accepted	Number of Applicants	Number of Qualified Applicants	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	% of Students from MN	Racial Profile of Students	Male: Female Ratio	
Doctorate Degree		954 2285 TC	509 + N/A TC	75 266 TC	55 165 TC	53 165 TC	92 2166 TC	625 2166 TC	355 + N/A TC	92 2166 TC	92% 77% TC	Duluth + 14 Other = 72% TC	93% 72% TC	53 165 TC	52 White, 1 Asian, P, Duluth + 127 White, 12 URM, 28 Other = 77% TC	53 165 TC	52 White, 2 A, Indian, 3 Asian/P/Islander = Duluth + 29 URM, 14 Other = 72% TC
		55 165 TC	53 165 TC	92 270 TC	53 165 TC	92 270 TC	625 2166 TC	355 + N/A TC	92 2166 TC	92% 77% TC	Duluth + 14 Other = 72% TC	93% 72% TC	53 165 TC	52 White, 2 A, Indian, 3 Asian/P/Islander = Duluth + 127 White, 12 URM, 28 Other = 77% TC	53 165 TC	52 White, 2 A, Indian, 2 Asian/P, Islander, 1 M, American = Duluth + 129 White, 16 URM, 20 Other = 75% TC	

**University of Minnesota Workforce Taskforce
Workforce Data for the School of Medicine**

Post M.D. Residency	2002										2001										2000									
	Number of Applicants	Number of Students Accepted	Number Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicants	Number of Students Accepted	Number Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicants	Number of Students Accepted	Number Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicants	Number of Students Accepted	Number Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio						
Anesthesiology	363	Not Asked	Not Asked	7	Not avail.	Not avail.	Not avail.	Not Asked	Not Asked	Not Asked	Not avail.	Not avail.	Not Asked	Not Asked	Not Asked	7	Not avail.	Not avail.	Not avail.	Not Asked	Not Asked	Not Asked	8	Not avail.	Not avail.	Not avail.				
Dermatology	348	Not Asked	Not Asked	5	60%	White-5	Approx. 350	Not Asked	Not Asked	Not Asked	White-5, Asian-2	3M-4F	Not Asked	Not Asked	Not Asked	7	71%	White-5, Asian-2	3M-4F	Not Asked	Not Asked	Not Asked	4	50%	White-4	0-4				
Emergency Medicine - HCMC	Approx. 400	Not Asked	Not Asked	11	36%	White-8, Asian-1, Hispanic-2	Approx. 400	Not Asked	Not Asked	Not Asked	White-11	5M-6F	Not Asked	Not Asked	Not Asked	11	27%	White-11	5M-6F	Not Asked	Not Asked	Not Asked	11	45%	White-11	8M-3F				
Emergency Medicine - Regions	269	Not Asked	Not Asked	9	67%	White-9	275	Not Asked	Not Asked	Not Asked	White-9	7M-2F	Not Asked	Not Asked	Not Asked	9	44%	White-9	7M-2F	Not Asked	Not Asked	Not Asked	9	33%	White-9	7M-2F				
Family Medicine & Community Health	370	Not Asked	Not Asked	42	Not avail.	Not avail.	350	Not Asked	Not Asked	Not Asked	Not avail.	Not avail.	Not Asked	Not Asked	Not Asked	41	Not avail.	Not avail.	Not avail.	Not Asked	Not Asked	Not Asked	42	Not avail.	Not avail.	Not avail.				
Laboratory Medicine & Pathology	86	Not Asked	Not Asked	5	60%	Not avail.	75	Not Asked	Not Asked	Not Asked	2M-3F	2-1	Not Asked	Not Asked	Not Asked	6	33%	Not avail.	2-1	Not Asked	Not Asked	Not Asked	5	0%	Not avail.	3M-2F				
Neurology	130	Not Asked	Not Asked	5	Not avail.	Not avail.	Not avail.	Not Asked	Not Asked	Not Asked	Not avail.	Not avail.	Not Asked	Not Asked	Not Asked	4	Not avail.	White-2, SE Asian-1	Not avail.	Not Asked	Not Asked	Not Asked	3	Not avail.	Not avail.	Not avail.				
Neurosurgery	120	Not Asked	Not Asked	2	0%	White-1, Black-1	124	Not Asked	Not Asked	Not Asked	White-1	2-1	Not Asked	Not Asked	Not Asked	3	0%	White-1	2-1	Not Asked	Not Asked	Not Asked	2	0%	White-2	1-0				
Obstetrics, Gynecology & Women's Health	141	Not Asked	Not Asked	Not avail.	Not avail.	Not avail.	146	Not Asked	Not Asked	Not Asked	Not avail.	1-8	Not Asked	Not Asked	Not Asked	9	44%	White-3, Middle Eastern-1	1-8	Not Asked	Not Asked	Not Asked	9	44%	Not avail.	0-1				
Ophthalmology	211	Not Asked	Not Asked	4	50%	White-4	214	Not Asked	Not Asked	Not Asked	White-4	1-1	Not Asked	Not Asked	Not Asked	4	100%	White-4	1-1	Not Asked	Not Asked	Not Asked	4	25%	White-3, Asian-1	1-0				
Orthopaedic Surgery	394	Not Asked	Not Asked	Not avail.	Not avail.	Not avail.	389	Not Asked	Not Asked	Not Asked	White-3, Black-1	5M-2F	Not Asked	Not Asked	Not Asked	7	43%	White-7	5M-2F	Not Asked	Not Asked	Not Asked	6	83%	White-6	5-1				
Otolaryngology	176	Not Asked	Not Asked	4	50%	White-3, Black-1	181	Not Asked	Not Asked	Not Asked	White-3, Asian-2, Asian-1	1-3	Not Asked	Not Asked	Not Asked	4	50%	White-3, Asian-1	1-3	Not Asked	Not Asked	Not Asked	4	25%	White-3, Hispanic-1	1-0				
Pediatrics	285	Not Asked	Not Asked	23	35%	Asian-2, Indian-1	280	Not Asked	Not Asked	Not Asked	Asian-2, Indian-1	4M-19F	Not Asked	Not Asked	Not Asked	23	61%	Asian-2, Indian-1	4M-19F	Not Asked	Not Asked	Not Asked	22	29%	White-20, Asian-2	6M-16F				
Physical Medicine & Rehabilitation	500 Overall	Not Asked	Not Asked	20 Overall	25% Overall	Not avail.	*No Split	Not Asked	Not Asked	Not Asked	13M-7F Overall	*No Split	Not Asked	Not Asked	Not Asked	*No Split	*No Split	Not avail.	*No Split	Not Asked	Not Asked	Not Asked	*No Split	Not Asked	Not Avail.	*No Split	*No Split			
Psychiatry	137	Not Asked	Not Asked	7	29%	White-6, Other-1	164	Not Asked	Not Asked	Not Asked	White-6	1-5	Not Asked	Not Asked	Not Asked	6	83%	White-6	1-5	Not Asked	Not Asked	Not Asked	5	80%	White-4, Other-1	0-1				
Radiology	320	Not Asked	Not Asked	11	36%	White-6, Asian-3, Indian-1, A. Indian-1, not indicate-1	391	Not Asked	Not Asked	Not Asked	White-6, Asian-3, Indian-1, A. Indian-1, not indicate-1	9M-2F	Not Asked	Not Asked	Not Asked	10	60%	White-7, Asian-2, Indian-1, not indicate-2	1-0	Not Asked	Not Asked	Not Asked	10	60%	White-9, Asian-2, Asian-1	4-1				
Surgery	Not avail.	Not Asked	Not Asked	7	14%	Not avail.	Not avail.	Not Asked	Not Asked	Not Asked	4M-3F	1-2	Not Asked	Not Asked	Not Asked	6	67%	Not avail.	1-2	Not Avail.	Not Asked	Not Asked	6	67%	Not avail.	5-1				
Therapeutic Radiology	101	Not Asked	Not Asked	1	100%	Not avail.	119	Not Asked	Not Asked	Not Asked	2-0	0-2	Not Asked	Not Asked	Not Asked	1	100%	Not avail.	0-2	Not Avail.	Not Asked	Not Asked	2	50%	White-1	1-0				
Urologic Surgery	126	Not Asked	Not Asked	2	50%	White-2	106	Not Asked	Not Asked	Not Asked	White-2	1-0	Not Asked	Not Asked	Not Asked	2	50%	White-2	1-0	Not Avail.	Not Asked	Not Asked	2	50%	M. Eastern	1-0				
Student & Resident Data (2002-2000)																														
Admissions Data																														
	Number of Applicants	Number of Students Accepted	Number Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicants	Number of Students Accepted	Number Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicants	Number of Students Accepted	Number Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicants	Number of Students Accepted	Number Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio						
	647	Duluth + 1645 TC + N/A TC	274 Duluth + 297 TC	87% Duluth + 78% TC	46 White, 5 A. Indian, 1 Black, 3 Asian/P. Islander = Duluth + 135 White, 9 URM, 21 Other = 74M: 92F TC	25M: 30F	744	Duluth + 1654 TC	247 Duluth + 275 TC	96% Duluth + 72% TC	50 White, 1 A. Indian, 2 Asian/P. Islander, 1 M. American = Duluth + 128 White, 24 URM, 13 Other = 84M: 71F TC	35M: 19F	730	Duluth + 1696 TC	311 Duluth + 165 TC	83% Duluth + 85% TC	43 White, 8 A. Indian, 1 Asian/P. Islander, 1 M. American = Duluth + 101 URM, 24 Other = 33M: 20F Duluth + 77M: 88F TC	33M: 20F	53	Duluth + 165 TC	53	Duluth + 165 TC	53	Duluth + 165 TC	53	Duluth + 165 TC				
Doctorate Degree	Not avail.	Not Asked	Not Asked	6	Not avail.	Not avail.	Not avail.	Not Asked	Not Asked	Not Asked	Not avail.	Not avail.	Not Asked	Not Asked	Not Asked	6	Not avail.	Not avail.	Not avail.	Not Asked	Not Asked	Not Asked	8	Not avail.	Not avail.	Not avail.				
Post M.D. Residency	Not avail.	Not Asked	Not Asked	6	Not avail.	Not avail.	Not avail.	Not Asked	Not Asked	Not Asked	Not avail.	Not avail.	Not Asked	Not Asked	Not Asked	6	Not avail.	Not avail.	Not avail.	Not Asked	Not Asked	Not Asked	8	Not avail.	Not avail.	Not avail.				

**University of Minnesota Workforce Taskforce
Workforce Data for the School of Medicine**

Graduate Data (2005-2003)		2005					2004					2003					%	
Residency	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN
Dermatology	Not Asked	Not Asked	Not Asked	Not Asked	Not Asked	Not Asked	Not Asked	Not Asked	Not Asked	Not Asked	Not Asked	Not Asked	Not Asked	Not Asked	Not Asked	Not Asked	Not Asked	Not Asked
Emergency Medicine - HCMC	Approx. 350	40%	White-5 White-10, Asian-1	1.4	Approx. 350	17%	White-3, Asian/Indian-1, Persian-1	1.2	Approx. 350	17%	White-3, Asian/Indian-1, Persian-1	1.2	Approx. 350	17%	White-3, Asian/Indian-1, Persian-1	1.2	Approx. 350	17%
Emergency Medicine - Regions	Not Asked	Not Asked	White-10, Asian-1	9M, 2F	Approx. 400	27%	White-11	7M, 4F	Approx. 400	36%	White-11	7M, 4F	Approx. 400	36%	White-11	7M, 4F	Approx. 400	36%
Family Medicine & Community Health Laboratory Medicine & Pathology	260	25%	White-8	3M, 5F	292	36%	White-8	5M, 3F	301	36%	White-8	5M, 3F	301	36%	White-8	5M, 3F	301	36%
Neurology	Not Asked	Not Asked	Not Available	Not Available	324	43%	Not Available	Not Available	491	43%	Not Available	Not Available	491	43%	Not Available	Not Available	491	43%
Neurosurgery	Not Asked	Not Asked	Not Available	Not Available	89	17%	Not Available	Not Available	77	17%	Not Available	Not Available	77	17%	Not Available	Not Available	77	17%
Obstetrics, Gynecology & Women's Health	87	0%	White-3	1.0	71	80%	White-1, SE Asian-1	1.0	86	80%	White-1, SE Asian-1	1.0	86	80%	White-1, SE Asian-1	1.0	86	80%
Ophthalmology	124	33%	Not Available	0.1	134	33%	Not Available	1.8	173	33%	Not Available	1.8	173	33%	Not Available	1.8	173	33%
Orthopaedic Surgery	209	50%	White-4	3.1	195	50%	White-3, Middle Eastern-1	1.1	182	50%	White-3, Middle Eastern-1	1.1	182	50%	White-4	3.1	195	50%
Otolaryngology	356	67%	White-6	2.1	381	67%	White-6	5.1	383	67%	White-6	5.1	383	67%	White-6	5.1	383	67%
Pediatrics	Not Asked	Not Asked	White-4	3.1	141	75%	White-4	3.1	127	75%	White-3, Asian/P, Islander-1	1.0	137	75%	White-3, Asian/P, Islander-1	1.0	127	75%
Physical Medicine & Rehabilitation	226	44%	White-21, Asian-1, Black-1	4M, 19F	286	44%	White-21, Asian-1, Black-1	4M, 19F	286	48%	White-6, Black-1	6M, 17F	346	48%	White-6, Black-1	6M, 17F	346	48%
Psychiatry	172	100%	White-5, Other-1	5.1	240	100%	White-5, Other-1	5.1	240	80%	White-4, Asian-1	1.4	1000	80%	White-4, Asian-1	1.4	1000	80%
Radiology	346	40%	White-4, Black-1, Asian/P, Islander-4, not indicate-1	4.1	325	40%	White-6, Asian/P, Islander-2, Hispanic-1	8.1	300	22%	White-6, Asian/P, Islander-2, Hispanic-1	8.1	300	22%	White-6, Asian/P, Islander-2, Hispanic-1	8.1	300	22%
Surgery	Not Available	Not Asked	Not Available	5.1	Not Available	33%	Not Available	5.1	Not Available	0%	Not Available	5.1	Not Available	0%	Not Available	5.1	Not Available	33%
Therapeutic Radiology	117	50%	White-1, M. Eastern	1.0	Not Available	50%	White-1, M. Eastern	1.0	Not Available	50%	White-1, M. Eastern	1.0	Not Available	50%	White-1, M. Eastern	1.0	Not Available	50%
Urologic Surgery	105	100%	White-1	1.1	118	100%	White-2	1.0	Not Available	0%	White-2	1.0	Not Available	0%	White-2	1.0	Not Available	100%
Graduate Data (2005-2003)	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN
Doctorate Degree	224	51%	211	51%	208	50%	208	50%	208	50%	208	50%	208	50%	208	50%	208	50%
Anesthesiology	9	78%	7	78%	8	57%	8	57%	8	25%	8	25%	8	25%	8	25%	8	25%
Dermatology	7	57%	4	57%	5	25%	5	25%	5	25%	5	25%	5	25%	5	25%	5	25%
Emergency Medicine - HCMC	11	73%	11	73%	11	45%	11	45%	11	45%	11	45%	11	45%	11	45%	11	45%
Emergency Medicine - Regions	9	56%	7	56%	8	57%	8	57%	8	50%	8	50%	8	50%	8	50%	8	50%
Family Medicine & Community Health	41	88%	43	88%	46	67%	46	67%	46	72%	46	72%	46	72%	46	72%	46	72%
Laboratory Medicine & Pathology	6	Unknown	5	Unknown	4	20%	4	20%	4	50%	4	50%	4	50%	4	50%	4	50%
Neurology	4	Not Available	5	Not Available	4	Not Available	4	Not Available	4	Not Available	4	Not Available	4	Not Available	4	Not Available	4	Not Available
Neurosurgery	1	0%	3	0%	1	0%	1	0%	1	0%	1	0%	1	0%	1	0%	1	0%
Obstetrics, Gynecology & Women's Health	4	Not Available	8	38%	9	56%	9	38%	9	56%	9	56%	9	56%	9	56%	9	56%
Ophthalmology	4	90%	4	90%	4	100%	4	90%	4	100%	4	90%	4	100%	4	90%	4	100%
Orthopaedic Surgery	6	50%	6	50%	5	40%	5	40%	5	40%	5	40%	5	40%	5	40%	5	40%
Otolaryngology	4	Not Available	4	Not Available	4	Not Available	4	Not Available	4	Not Available	4	Not Available	4	Not Available	4	Not Available	4	Not Available
Pediatrics	25	26%	25	26%	23	32%	23	32%	23	44%	23	44%	23	44%	23	44%	23	44%
Physical Medicine & Rehabilitation	16 overall	38% overall	*No Spill	38% overall	*No Spill	*No Spill	*No Spill	*No Spill	*No Spill	*No Spill	*No Spill	*No Spill	*No Spill	*No Spill	*No Spill	*No Spill	*No Spill	*No Spill

University of Minnesota Workforce Taskforce
Workforce Data for the School of Medicine

Graduate Data (2002-2000)		2002	2001	2000	2000
Doctorate Degree	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN	Number of graduates
Psychiatry	9			100%	7
Radiology	11	89%	4		12
Surgery	6	45%	8	75%	6
Therapeutic Radiology	2	33%	6	0%	17%
Urologic Surgery	2	100%	2	100%	0%
				50%	50%
Doctor of Medicine (M.D.)					
	209	58%	215	58%	232
Post M.D. Residency					
Anesthesiology	10	60%	6	50%	8
Dermatology	5	40%	6	67%	4
Emergency Medicine - HCMC	11	27%	11	45%	11
Emergency Medicine - Regions	7	57%	8	50%	7
Family Medicine & Community Health	38	79%	45	81%	50
Laboratory Medicine & Pathology	4		7	29%	9
Neurology	3	25%	4	Not avail.	4
Neurosurgery	2	0%	2	50%	3
Obstetrics, Gynecology & Women's Health	9	67%	9	67%	9
Ophthalmology	4	Not avail.	4	Not avail.	4
Orthopaedic Surgery	7	43%	5	80%	7
Otolaryngology	4		4		4
Pediatrics	23	Not avail.	23	28%	23
Physical Medicine & Rehabilitation	*No Split				
Psychiatry	5	*No Split	*No Split	*No Split	*No Split
Radiology	7	60%	4	50%	8
Surgery	6	43%	8	75%	10
Therapeutic Radiology	1	50%	6	50%	6
Urologic Surgery	2	100%	2	0%	1
		100%	2	0%	2

*No Split = Program gave overall number for 5 years instead of breaking the number into 6 distinct points

**URM = Underrepresented in Medicine (those racial and ethnic populations that are underrepresented in the medical profession relative to their numbers in the general population; i.e., Black/African American, Native American (A. Indian, Alaska Native), Native Hawaiian, Mexican-American, mainland Puerto Rican, all Hispanic, Hmong)

**University of Minnesota Workforce Taskforce
Workforce Data for the University of Minnesota School of Nursing**

General Information													
Vision	The School of Nursing will be a leader in knowledge development and dissemination and will be nationally and internationally recognized for at least three areas of excellence that promote the health and care of individuals, families, communities, and populations.												
Mission	The mission of the School of Nursing is to generate and disseminate to students, peers, the wider community and the world knowledge necessary for improving the nursing care of individuals, families, communities and populations.												
Description of Service Area	Primarily Minnesota												
Primary Focus of Educational Offerings	Advanced Practice Nurses and Nursing Faculty for Minnesota												
Secondary Focus of Educational Offerings	Top ranked Bachelor's degree nurses												
Accreditation Agency	Commission on Collegiate Nursing Education												
Professional Associations and resources utilized for workforce data	American Nursing Association, Minnesota Nursing Association,												
National and state financial incentives	National Health Service Corps, Minnesota Loan Forgiveness Program, HRSA Nursing Education Loan Repayment Program												
Degree Programs/Student Statistics													
Degree Program		Program Length		Number of students		Number of Clinical Hours		In State Tuition		Out-of-State Tuition		Average Debt Load	
Bachelor's Degree	BSN	3 years		365		1020		\$3570/semester		\$9,385		\$20,554	
Student Data (2005-2003)	Admissions Data												
			2005				2004				2003		
			Number of Applicants	Number of Qualified Applicants	Number of Applicants	Number of Qualified Applicants	Number of Applicants	Number of Qualified Applicants	Number of Applicants	Number of Qualified Applicants	Number of Applicants	Number of Qualified Applicants	Number of Applicants
			534	417	537	367	133	495	274	127	124		
			% of Students from MN	% of Students from MN	% of Students from MN	% of Students from MN	% of Students from MN	% of Students from MN	% of Students from MN	% of Students from MN	% of Students from MN	% of Students from MN	% of Students from MN
			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Male: Female Ratio	Male: Female Ratio	Male: Female Ratio	Male: Female Ratio	Male: Female Ratio	Male: Female Ratio	Male: Female Ratio	Male: Female Ratio	Male: Female Ratio	Male: Female Ratio	Male: Female Ratio
			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bachelor's Degree	BSN												
Student Data (2002-2000)	Admissions Data												
			2002				2001				2000		
			Number of Applicants	Number of Qualified Applicants	Number of Applicants	Number of Qualified Applicants	Number of Applicants	Number of Qualified Applicants	Number of Applicants	Number of Qualified Applicants	Number of Applicants	Number of Qualified Applicants	Number of Applicants
			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			% of Students from MN	% of Students from MN	% of Students from MN	% of Students from MN	% of Students from MN	% of Students from MN	% of Students from MN	% of Students from MN	% of Students from MN	% of Students from MN	% of Students from MN
			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Male: Female Ratio	Male: Female Ratio	Male: Female Ratio	Male: Female Ratio	Male: Female Ratio	Male: Female Ratio	Male: Female Ratio	Male: Female Ratio	Male: Female Ratio	Male: Female Ratio	Male: Female Ratio
			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Graduate Data (2005-2003)	Graduate Data												
			2005				2004				2003		
			Number of graduates	Number of graduates	Number of graduates	Number of graduates	Number of graduates	Number of graduates	Number of graduates	Number of graduates	Number of graduates	Number of graduates	Number of graduates
			112	108	86	86							
			% practicing in MN	% practicing in MN	% practicing in MN	% practicing in MN	% practicing in MN	% practicing in MN	% practicing in MN	% practicing in MN	% practicing in MN	% practicing in MN	% practicing in MN
			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Graduate Data (2002-2000)	Graduate Data												
			2002				2001				2000		
			Number of graduates	Number of graduates	Number of graduates	Number of graduates	Number of graduates	Number of graduates	Number of graduates	Number of graduates	Number of graduates	Number of graduates	Number of graduates
			88	98	89	89							
			% practicing in MN	% practicing in MN	% practicing in MN	% practicing in MN	% practicing in MN	% practicing in MN	% practicing in MN	% practicing in MN	% practicing in MN	% practicing in MN	% practicing in MN
			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bachelor's Degree	BSN												

**University of Minnesota Workforce Taskforce
Workforce Data for the University of Minnesota College of Pharmacy**

General Information																											
Category	Description	Out-of-State Tuition	In State Tuition	Number of Clinical Hours	Number of students	Program Length	2005						2006						Average Debt Load								
							Number of Applicants	Number of Qualified Applicants	Number of Students Accepted	Number of Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicants	Number of Qualified Applicants	Number of Students Accepted	Number of Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio							
Vision	The College of Pharmacy excels in innovation and leadership in all aspects of our mission while serving the health care needs of Minnesota. Our Doctor of Pharmacy graduates deliver essential pharmaceutical services and lead the profession. Our research, scholarship, and practice result in the development of new drugs and drug delivery systems, the optimization of pharmaceutical care and education. Our Masters and Doctors of Philosophy graduates are outstanding researchers in academia, industry, government, and practice settings.																										
Mission	The College of Pharmacy educates pharmacy practitioners to meet the pharmaceutical care needs of the people of Minnesota and the rest of society. The college is committed to improving human health through the development of new drugs and drug delivery systems, optimization of drug use, and improvement of pharmaceutical services. It is committed to advancing pharmaceutical technology to strengthen Minnesota's economy.																										
Description of Service Area	Primarily Minnesota; Duluth program designed for pharmacists to provide pharmaceutical services in rural areas of Minnesota																										
Primary Focus of Educational Offerings	The College's courses are offered by four departments: Medicinal Chemistry, Pharmaceutical Care and Health Systems, and Experimental and Clinical Pharmacology.																										
Secondary Focus of Educational Offerings	The second/third years of the Pharm.D. program allow students to engage in different courses taught as electives in areas such as herbal remedies, advanced practice pharmaceutical care, geriatrics, etc.																										
Accreditation Agency	Accreditation Council for Pharmacy Education (ACPE)																										
Professional Associations and Resources Utilized for Workforce Data	Minnesota Pharmacists Association (MPHA), Minnesota Society for Health-System Pharmacists (MSHP), American Pharmacists Association (APHA), American Society for Health-System Pharmacists (ASHP), American Association of Colleges of Pharmacy (AACCP), Minnesota Board of Pharmacy																										
National and State Financial Incentives	Walgreens. Rural Pharmacist Loan Forgiveness administered by the MN Department of Health's Office of Rural Health and Primary Care																										
Degree Programs/Student Statistics																											
Degree Program		Out-of-State Tuition	In State Tuition	Number of Clinical Hours	Number of students	Program Length	2005						2006						Average Debt Load								
	Doctor of Pharmacy - Traditional	\$25,762 + Fees (\$38,643 4th year tuition)	\$14,374 + \$465.44 Student Services Fee + \$900 University Fee + \$200 Collegiate Fee + \$158.40 Computer Network Access Fee + \$23.06 GAPSA Fee (\$21,561 4th year tuition)	1800	158 (105 in TC and 53 in Duluth)	4 years	885	540	212	156	73.7%	White-124, Asian-10, Black-6, A. Indian-1, Other-4, Unknown-8	54M:102F	392	189	159	77.3%	White-115, Asian-14, Black-4, A. Indian-1, Hispanic-2, Other-7, Unknown-8	49M:109F	499	198	166	74.7%	White-129, Asian-19, Black-8, International-2, Unknown-8	34M:132F		
Student Data (2005-2006)																											
Admissions Data							2005						2006														
							Number of Applicants	Number of Qualified Applicants	Number of Students Accepted	Number of Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicants	Number of Qualified Applicants	Number of Students Accepted	Number of Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio							
	Doctor of Pharmacy - Traditional						885	540	212	156	73.7%	White-124, Asian-10, Black-6, A. Indian-1, Other-4, Unknown-8	54M:102F	392	189	159	77.3%	White-115, Asian-14, Black-4, A. Indian-1, Hispanic-2, Other-7, Unknown-8	49M:109F	499	198	166	74.7%	White-129, Asian-19, Black-8, International-2, Unknown-8	34M:132F		
Student Data (2002-2003)																											
Admissions Data							2002						2003														
							Number of Applicants	Number of Qualified Applicants	Number of Students Accepted	Number of Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicants	Number of Qualified Applicants	Number of Students Accepted	Number of Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio							
	Doctor of Pharmacy - Traditional						366	299	126	107	78.5%	White-84, Asian-9, Black-6, A. Indian-1, Unknown-7	20M:87F	308	219	131	106	80.2%	White-94, Asian-8, Black-3, Unknown-1	47M:59F	305	242	151	103	75.7%	White-79, Asian-9, Black-3, Hispanic-1, International-3, Unknown-8	35M:68F
Graduate Data (2002-2003)																											
Admissions Data							2002						2003														
							Number of graduates	Number of graduates	Number of graduates	Number of graduates	% practicing in MN			Number of graduates	Number of graduates	Number of graduates	Number of graduates	% practicing in MN									
	Doctor of Pharmacy - Traditional						101				78%			97				80%									
Graduate Data (2002-2000)																											
Admissions Data							2002						2000														
							Number of graduates	Number of graduates	Number of graduates	Number of graduates	% practicing in MN			Number of graduates	Number of graduates	Number of graduates	Number of graduates	% practicing in MN									
	Doctor of Pharmacy - Traditional						103				74%			72				71%									

**University of Minnesota Workforce Taskforce
Workforce Data for the University of Minnesota School of Public Health**

General Information		Through our education, research, and community outreach, we focus on improving the health of populations. We emphasize prevention of illness and injury, and we look at health through a multi-faceted prism that includes physiology, the environment, communities, economics, and public policy. This interdisciplinary approach allows us to collaborate with many other schools throughout the University, including the College of Veterinary Medicine and the Medical School, as well as the Humphrey Institute of Public Affairs, the Carlson School of Management, and the College of Agriculture. By combining our expertise, we can explore innovative, far-reaching ways of maintaining and improving the health of the people in Minnesota and throughout the country and world.																							
Vision																									
Mission																									
Description of Service Area																									
Primary Focus of Educational Offerings																									
Secondary Focus of Educational Offerings																									
Accreditation Agency	Council on Education for Public Health (CEPH), Accreditation Board for Engineering & Technology (ABET), Accrediting Commission on Education for Health Services Administration (ACEHSA)																								
Professional Associations and Resources Utilized for Workforce Data																									
National and State Financial Incentives																									
Degree Programs/Student Statistics																									
Degree Program	Program Length	Number of students	Number of Clinical Hours	In State Tuition	Out-of-State Tuition	Average Debt Load	2005				2004				2003										
							Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	
Master in Public Health (M.P.H.) Degree	2 years	2	0	\$466/credit	\$764/credit	\$25,022 average overall																			
Community Health Education	2 years	65	0	**	**	**																			
Environmental Health	2 years	60	0	**	**	**																			
Epidemiology	2 years	109	0	**	**	**																			
Maternal and Child Health	2 years	49	0	**	**	**																			
Public Health Administration and Policy	2 years	78	0	**	**	**																			
Public Health Nutrition	2 years	38	0	**	**	**																			
Executive Program in Public Health Practice	3 years	55	0	**	**	**																			
Master of Healthcare Administration (M.H.A.)	2 years	70	0	**	**	**																			
Healthcare Administration	2 years	70	0	**	**	**																			
M.S. Degree	2 years	44	0	\$729/credit - plateau is \$4,374 for 8-14 credits	\$1,321/credit - plateau is \$7,924 for 6-8 credits	**																			
Biostatistics	2 years	44	0	**	**	**																			
Chemical Research	2 years	56	0	**	**	**																			
Community Health	2 years	29	0	**	**	**																			
Health Services Research, Policy, and Administration	2 years	29	0	**	**	**																			
Ph.D. Degree	4 years	16	0	**	**	**																			
Biostatistics	4 years	16	0	**	**	**																			
Environmental Health	4 years	31	0	**	**	**																			
Epidemiology	5 years	37	0	**	**	**																			
Health Services Research, Policy, and Administration	4 years	50	0	**	**	**																			
Student Data (2005-2009)																									
Admissions Data																									
Degree Program	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio							
Master in Public Health (M.P.H.) Degree	3	Not avail.	2	Not avail.	White-2	0:1	1	Not avail.	1	Not avail.	White-1	0:1	Combine below	Not avail.	Combine below	Not avail.	Combine below	Combine below							
Biostatistics					White-16, Asian/Ha wain-2, Foreign-1, Multi-1	4M: 20F	72	Not avail.	47	Not avail.	White-26, Black-1, Unknown-	1:1	Combine below	Not avail.	Combine below	Not avail.	Combine below	Combine below							
Community Health Education	66	Not avail.	54	24	Not avail.	Foreign-2	4M: 18F	46	Not avail.	43	Not avail.	Foreign-5	10M: 16F	94	Combined	58	Combined	41	Combined						
Environmental Health	48	Not avail.	39	22	Not avail.	Foreign-5	4M: 18F	46	Not avail.	43	Not avail.	Foreign-5	10M: 16F	94	Combined	58	Combined	41	Combined						

University of Minnesota Workforce Taskforce
Workforce Data for the University of Minnesota School of Public Health

Degree Program Master Degrees	2005										2004										2003										
	Number of Applicant s	Number of Qualified Applicant s	Number of Applicant s Accepted	Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicant s	Number of Qualified Applicant s	Number of Applicant s Accepted	Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicant s	Number of Qualified Applicant s	Number of Applicant s Accepted	Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicant s	Number of Qualified Applicant s	Number of Applicant s Accepted	Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio			
Epidemiology	143	Not avail.	100	44	Not avail.	White-33, Asian/Ha walian-1, Multi-3, Foreign-7	14M: 30F	127	Not avail.	93	46	Not avail.	White-36, Asian/Ha walian-1, Black-5, Foreign-4	12M: 34F	169	Combined	80	Combined	34	Combined	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	White-26, Asian/Ha walian-3, Hispanic-2, Unknown-1, Foreign-2	13M: 21F	
Maternal and Child Health	58	Not avail.	42	18	Not avail.	White-13, Asian/Ha walian-1, Black-2, Multi-1, Foreign-1	1:17	30	Not avail.	26	11	Not avail.	White-4, Asian/Ha walian-1, Black-3, Unknown-1, Foreign-2	1:10	38	Combined	31	Combined	15	Combined	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	White-12, Asian/Ha walian-1, Black-1, A. Indian-1	0:15	
Student Data (2005-2003) (continued) Admissions Data																															
Public Health Administration and Policy	75	Not avail.	59	30	Not avail.	White-20, Asian/Ha walian-1, Black-3, A. Indian-2, Unknown-2, Foreign-2	1:5	68	Not avail.	59	28	Not avail.	White-16, Asian/Ha walian-3, Black-2, Unknown-2, Foreign-5	1:6	60	Not avail.	46	25	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	White-19, Asian/Ha walian-2, Unknown-1, Foreign-3	9M: 16F
Public Health Nutrition	39	Not avail.	28	16	Not avail.	White-12, Asian/Ha walian-1, Black-1, Hispanic-1, Foreign-1	0:16	31	Not avail.	25	13	Not avail.	White-13	2M: 11F	21	Not avail.	16	13	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	White-10, Asian/Ha walian-1, Unknown-1, Foreign-1	0:13
Executive Program in Public Health Practice	76	Not avail.	66	40	Not avail.	White-34, Asian/Ha walian-3, Hispanic-1, Unknown-1, Foreign-1	13M: 27F	54	Not avail.	47	31	Not avail.	White-18, Asian/Ha walian-1, Black-2, Unknown-3, Foreign-5	10M: 21F	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Healthcare Administration	91	Not avail.	43	30	Not avail.	Not avail.	11M: 19F	96	Not avail.	41	31	Not avail.	Not avail.	14M: 17F	108	Not avail.	46	35	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.
Student Data (2005-2003) (continued) Admissions Data																															
Biostatistics	82	Not avail.	32	18	Not avail.	White-2, Multi-1, Foreign-19	5M: 13F	73	Not avail.	41	19	Not avail.	White-9, Unknown-1, Foreign-9	9M: 10F	104	Combined	38	Combined	20	Combined	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	White-3, Foreign-17	7M: 13F	
M.S. Degree																															

University of Minnesota Workforce Taskforce
Workforce Data for the University of Minnesota School of Public Health

Degree Program	2002										2001										2000									
	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	Number Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	Number Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	Number Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio									
Clinical Research	24	Not avail.	23	22	Not avail.	White-14, Asian/Hawaiian-2, Black-1, Unknown-1, Foreign-1, Foreign-4	13M: 9F	19	Not avail.	19	13	Not avail.	White-7, Asian/Hawaiian-2, Black-1, Foreign-3	5M: 8F	17	Not avail.	8	5	Not avail.	Asian/Hawaiian-1, Hispanic-1, Foreign-3	0:5									
Environmental Health	19	Not avail.	16	10	Not avail.	White-7, Asian/Hawaiian-1, Unknown-1, Foreign-1, Foreign-1	6M: 4F	13	Not avail.	6	Not avail.	White-4, Asian/Hawaiian-1, Unknown-1, Foreign-1	1:2	Combine above	Not avail.	Combine above	Combine above	Combine above	Combine above	Combine above	Combine above									
Health Services Research, Policy, and Administration	24	Not avail.	17	8	Not avail.	White-5, Multi-1, Foreign-2	1:3	25	Not avail.	14	11	Not avail.	White-7, Foreign-4	5M: 6F	72	Combine above	28	22	Combine above	White-18, Black-1, Unknown-2, Foreign-1	6M: 16F									
Biostatistics	34	Not avail.	9	4	Not avail.	Foreign-4	1:1	33	Not avail.	5	7	Not avail.	Foreign-7	4M: 3F	Combine above	Not avail.	Combine above	Combine above	Combine above	Combine above	Combine above									
Environmental Health	13	Not avail.	5	3	Not avail.	White-2, Black-1	1M: 2F	20	Not avail.	12	4	Not avail.	White-2, Black-1, Foreign-1	1:3	Combine above	Not avail.	Combine above	Combine above	Combine above	Combine above	Combine above									
Epidemiology	36	Not avail.	14	10	Not avail.	White-8, Asian/Hawaiian-1, Multi-1, Foreign-1	3M: 7F	26	Not avail.	9	7	Not avail.	White-3, Hispanic-1, Multi-1, Foreign-2	2M: 3F	Combine above	Not avail.	Combine above	Combine above	Combine above	Combine above	Combine above									
Health Services Research, Policy, and Administration	40	Not avail.	21	9	Not avail.	White-3, Black-1, Foreign-5	1:3	26	Not avail.	14	7	Not avail.	White-3, Foreign-4	3M: 4F	Combine above	Not avail.	Combine above	Combine above	Combine above	Combine above	Combine above									
Student Data (2002-2000)																														
Admissions Data																														
Degree Program	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	Number Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	Number Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	Number Enrolled From Acceptance	% of Students from MN	Racial Profile of Students	Male: Female Ratio									
Master Degrees	Combine below	Not avail.	Combine below	Combine below	Not avail.	Combine below	Combine below	Combine below	Not avail.	Combine below	Combine below	Not avail.	Combine below	Combine below	Combine below	Combine below	Combine below	Combine below	Combine below	Combine below	Combine below									
Master in Public Health (M.P.H.) Degree	60	Not avail.	43	22	Not avail.	White-18, Hispanic-3, Foreign-1	1:21	50	Not avail.	37	17	Not avail.	White-15, Asian/Hawaiian-1, Unknown-1	2M: 15F	88	Not avail.	52	26	Not avail.	Not avail.	Not avail.									
Environmental Health	76	Combine above	53	40	Combine above	White-28, Black-2, Hispanic-2, Unknown-4, Foreign-4	11M: 29F	47	Combine above	25	Combine above	Not avail.	White-21, Foreign-4	14M: 11F	32	Not avail.	25	28	Not avail.	Not avail.	Not avail.									

University of Minnesota Workforce Taskforce
Workforce Data for the University of Minnesota School of Public Health

Degree Program Master Degrees	2002										2001										2000									
	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	Number of Applicant \$	Number of Qualified Applicant \$	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio						
Epidemiology	155 Combined	Not avail.	91 Combined	50 Combined	Not avail.	White-32, Black-3, Hispanic-2, Unknown-5, Foreign-8, Combined	139 Combined	Not avail.	80 Combined	41 Combined	Not avail.	146 Combined	Not avail.	93 Combined	38 Combined	White-30, Asian/Ha walian-5, A. Indian-1, Foreign-5, Combined	16M: 25F Combined	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.					
Maternal and Child Health	41	Not avail.	24	15	Not avail.	White-12, Black-1, Hispanic-1, Unknown-1	50	Not avail.	22	12	Not avail.	44	Not avail.	25	13	White-10, A. Indian-1, Foreign-1	1:11	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.					
Student Data (2002-2000) (continued)																														
Admissions Data																														
Master in Public Health (M.P.H.) Degree (continued)																														
Public Health Administration and Policy	29	Not avail.	17	9	Not avail.	White-6, Asian/Ha walian-1, Unknown-2	50	Not avail.	32	12	Not avail.	50	Not avail.	32	14	White-10, Foreign-2	1:3	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.				
Public Health Nutrition Executive Program in Public Health Practice	20	Not avail.	16	8	Not avail.	White-7, Foreign-1	32	Not avail.	20	11	Not avail.	28	Not avail.	20	10	White-8, Asian/Ha walian-1, Hispanic-2	0:11	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.				
Master of Healthcare Administration (M.H.A.)	76	Not avail.	47	35	Not avail.	Not avail.	57	Not avail.	42	27	Not avail.	51	Not avail.	45	31	N/A	13M:14F	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.					
Student Data (2002-2000) (continued)																														
Admissions Data																														
Master in Public Health (M.P.H.) Degree																														
Biostatistics	89 Combined	Not avail.	51 Combined	28 Combined	Not avail.	White-7, Foreign-21, Combined	93 Combined	Not avail.	63 Combined	25 Combined	Not avail.	62	Not avail.	42	17	White-6, Asian/Ha walian-1, Foreign-18, Combined	8M: 17F Combined	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.					
Clinical Research	19	Not avail.	13	12	Not avail.	White-8, Asian/Ha walian-1, Black-1, Unknown-1, Foreign-1	28	Not avail.	18	13	Not avail.	17	Not avail.	12	12	White-9, Asian/Ha walian-3, Foreign-1	6M: 7F Combine above	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.					
Environmental Health	Combine above	Not avail.	Combine above	Combine above	Not avail.	Combine above	Combine above	Not avail.	Combine above	Combine above	Not avail.	21	Not avail.	17	8	Combine above	8M: 7M: 8F Combine above	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.					
Health Services Research, Policy, and Administration	53 Combined	Not avail.	24 Combined	12 Combined	Not avail.	White-3, Unknown-3, Foreign-6, Combined	52 Combined	Not avail.	33 Combined	15 Combined	Not avail.	18	Not avail.	11	11	White-4, Asian/Ha walian-1, Unknown-5, Foreign-5, Combined	7M: 8F Combine above	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.					
Biostatistics	Combine above	Not avail.	Combine above	Combine above	Not avail.	Combine above	Combine above	Not avail.	Combine above	Combine above	Not avail.	Combine above	Not avail.	Combine above	Combine above	Combine above	Combine above	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.					
Environmental Health	Combine above	Not avail.	Combine above	Combine above	Not avail.	Combine above	Combine above	Not avail.	Combine above	Combine above	Not avail.	Combine above	Not avail.	Combine above	Combine above	Combine above	Combine above	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.					

University of Minnesota Workforce Taskforce
Workforce Data for the University of Minnesota School of Public Health

Degree Program	2005		2004		2003		Number of graduates	% practicing in MN	2000	Number of graduates	% practicing in MN		
	Combine above	Combine above	Combine above	Combine above	Combine above	Combine above						Combine above	Combine above
	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.						Not avail.	Not avail.
Graduate Data (2005-2003)	Number of graduates		Number of graduates		Number of graduates								
Master Degrees	0		0		0								
Master in Public Health (M.P.H.) Degree	N/A		N/A		N/A						N/A		
Biostatistics													
Community Health													
Education	8	25	Not avail.	25	Not avail.	16					Not avail.		
Environmental Health	26	14	Not avail.	14	Not avail.	16					Not avail.		
Epidemiology	26	34	Not avail.	34	Not avail.	22					Not avail.		
Maternal and Child Health	14	10	Not avail.	10	Not avail.	12					Not avail.		
Public Health Administration													
Public Health Nutrition and Policy	16	13	Not avail.	13	Not avail.	16					Not avail.		
Public Health Nutrition	10	6	Not avail.	6	Not avail.	14					Not avail.		
Executive Program in Public Health Practice	8	6	Not avail.	6	Not avail.	1					Not avail.		
Master of Healthcare Administration (M.H.A.)	28		34%		27						27%		
Healthcare Administration													
M.S. Degree	17		Not avail.		23						Not avail.		
Biostatistics	5	7	Not avail.	7	Not avail.	11					Not avail.		
Clinical Research	4	10	Not avail.	10	Not avail.	5					Not avail.		
Environmental Health													
Health Services Research, Policy, and Administration	7	4	Not avail.	4	Not avail.	4					Not avail.		
Ph.D. Degree	5		Not avail.		4						Not avail.		
Biostatistics	5	4	Not avail.	4	Not avail.	1					Not avail.		
Environmental Health	5	5	Not avail.	5	Not avail.	1					Not avail.		
Epidemiology	5	9	Not avail.	9	Not avail.	5					Not avail.		
Health Services Research, Policy, and Administration	5	5	Not avail.	5	Not avail.	4					Not avail.		
Graduate Data (2002-2000)	Number of graduates		Number of graduates		Number of graduates								
Graduate Program	0		0		0								
Master Degrees	0		0		0								
Master in Public Health (M.P.H.) Degree	N/A		N/A		N/A								
Biostatistics													
Community Health													
Education	14	19	Not avail.	19	Not avail.	9					Not avail.		
Environmental Health	15	13	Not avail.	13	Not avail.	15					Not avail.		
Epidemiology	27	19	Not avail.	19	Not avail.	21					Not avail.		
Maternal and Child Health	9	10	Not avail.	10	Not avail.	8					Not avail.		
Public Health Administration													
Public Health Nutrition and Policy	13	15	Not avail.	15	Not avail.	14					Not avail.		
Public Health Nutrition	5	17	Not avail.	17	Not avail.	15					Not avail.		
Executive Program in Public Health Practice	0	0	Not avail.	0	Not avail.	0					N/A		
Master of Healthcare Administration (M.H.A.)	20		27%		30						44%		
Healthcare Administration													
M.S. Degree	14		Not avail.		17						Not avail.		
Biostatistics	3	7	Not avail.	7	Not avail.	10					Not avail.		
Clinical Research	4	5	Not avail.	5	Not avail.	2					Not avail.		
Environmental Health													
Health Services Research, Policy, and Administration	4	3	Not avail.	3	Not avail.	5					Not avail.		
Ph.D. Degree	2		Not avail.		2						Not avail.		
Biostatistics	2	2	Not avail.	2	Not avail.	1					Not avail.		
Environmental Health	2	4	Not avail.	4	Not avail.	2					Not avail.		
Epidemiology													
Health Services Research, Policy, and Administration	6	7	Not avail.	7	Not avail.	5					Not avail.		

* Combined = Public Health database does not allow program separation MPH in Executive Program in Public Health Practice started in 2004

**University of Minnesota Workforce Taskforce
Workforce Data for the University of Minnesota School of Veterinary Medicine**

General Information																					
The vision for the Doctor of Veterinary Medicine (DVM) students is one of having "practice-ready" skills (including business and ethics), possessing the basic skills to pursue employment paths other than classical practice (e.g. industrial medicine and research, public/government practice, environmental/zoonotic monitoring, etc.), and promoting lifelong learning (including skills related to electronic communication and continuing education).																					
Improving the health of animals and people through: Education of current and future veterinarians and biomedical scientists, discovery and dissemination of new knowledge and skills, and provision of innovative veterinary services																					
Currently, 70 percent of Minnesota's practicing veterinarians are College of Veterinary Medicine alumni. Graduates also are employed in industry, the military, government, and higher education.																					
American Veterinary Medical Association (AVMA)																					
Professional Associations and Resources Utilized for Workforce Data																					
National and State Financial Incentives																					
Degree Programs/Student Statistics																					
Degree Program	Program Length	Number of students	Number of Clinical Hours	In State Tuition	Out-of-State Tuition	Average Debt Load															
Doctorate Degree (D.V.M.)	4 years	354	14 months	\$18,288	\$35,076	\$100,187															
Student Data (2005-2003)																					
Admissions Data	2005			2004			2003														
	Number of Applicants	Number of Qualified Applicants	Number of Students Accepted	Number of Applicants	Number of Qualified Applicants	Number of Students Accepted	Number of Applicants	Number of Qualified Applicants	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	% of Students from MN	Racial Profile of Students	Male: Female Ratio						
Doctor of Veterinary Medicine	751	360	125	90	60%	10%	Minority 32M: 78F	651	360	125	89	63%	3%	Minority 15M: 74F	650	360	130	94	51%	3.5%	Minority 15M: 79F
Admissions Data	2002			2001			2000														
	Number of Applicants	Number of Qualified Applicants	Number of Students Accepted	Number of Applicants	Number of Qualified Applicants	Number of Students Accepted	Number of Applicants	Number of Qualified Applicants	Number of Students Accepted	% of Students from MN	Racial Profile of Students	Male: Female Ratio	% of Students from MN	Racial Profile of Students	Male: Female Ratio						
Doctor of Veterinary Medicine	676	300	105	80	70%	5%	Minority 15M: 65F	853	300	105	80	78%	3%	Minority 12M: 68F	927	300	105	80	76%	3%	Minority 13M: 67F
Graduate Data (2005-2003)																					
Doctorate Degree (D.V.M.)	2005			2004			2003														
	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN															
Doctor of Veterinary Medicine	82	48%	79	54%	75	49%															
Graduate Data (2002-2000)																					
Doctorate Degree (D.V.M.)	2002			2001			2000														
	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN	Number of graduates	% practicing in MN															
Doctor of Veterinary Medicine	74	64%	73	55%	77	46%															